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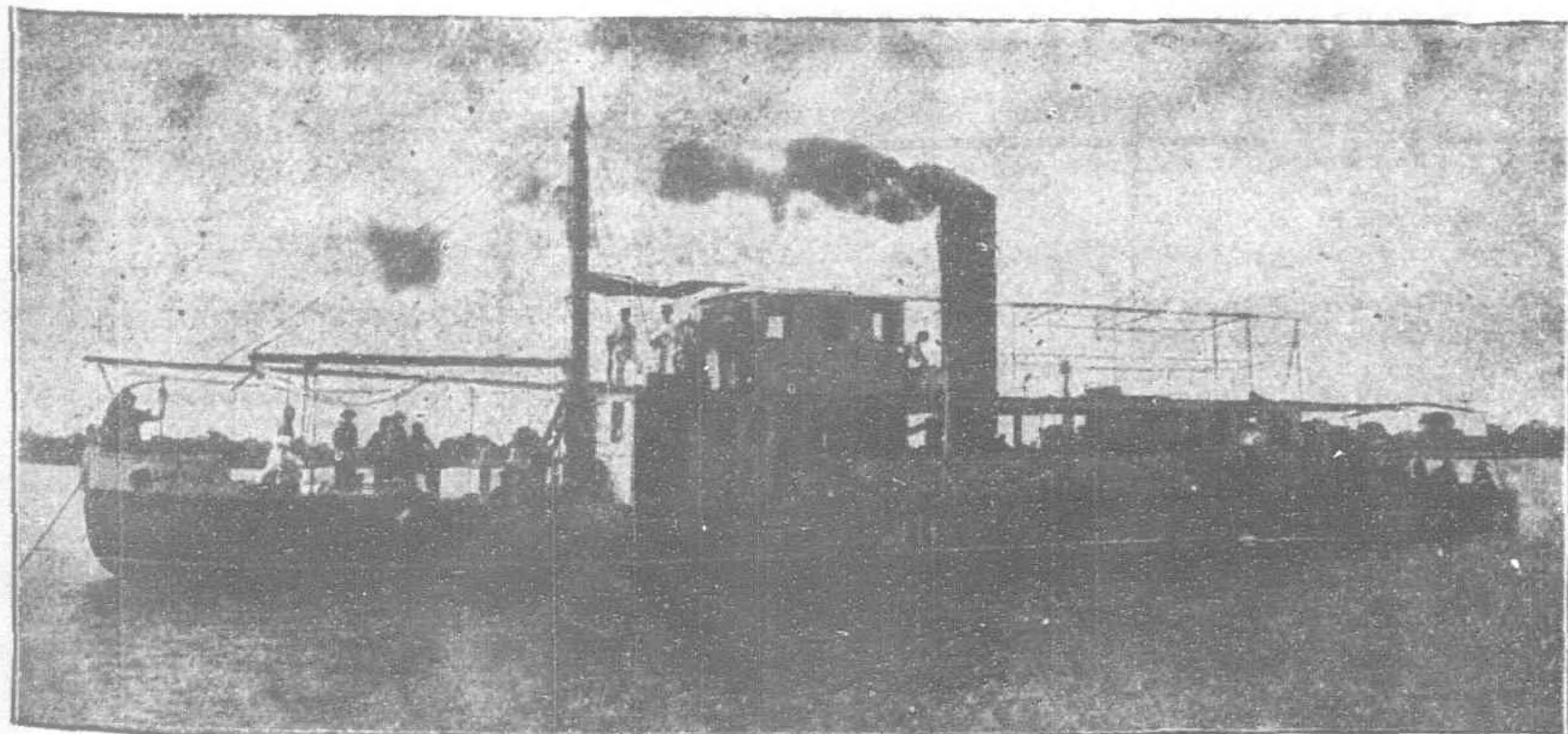
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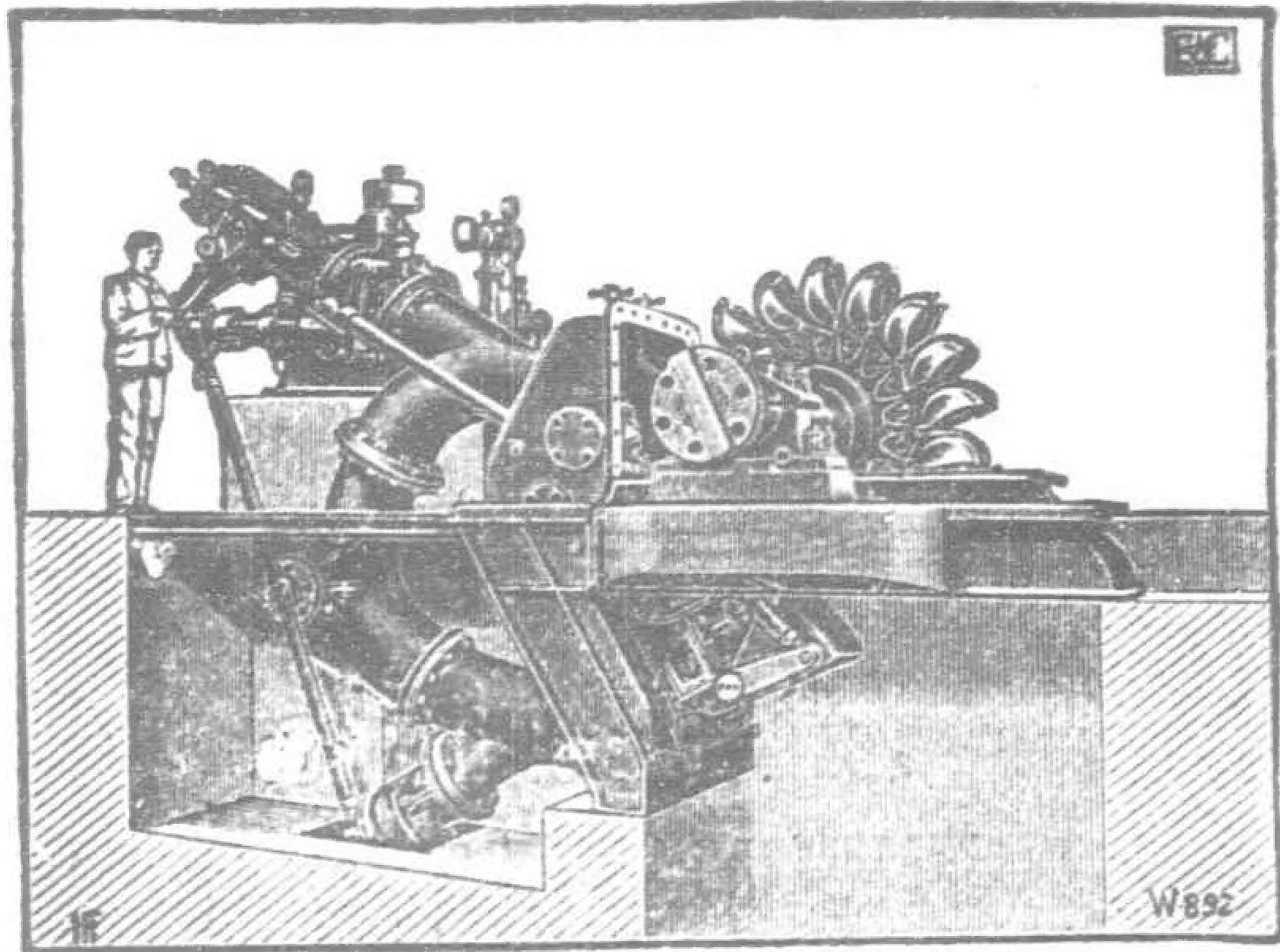
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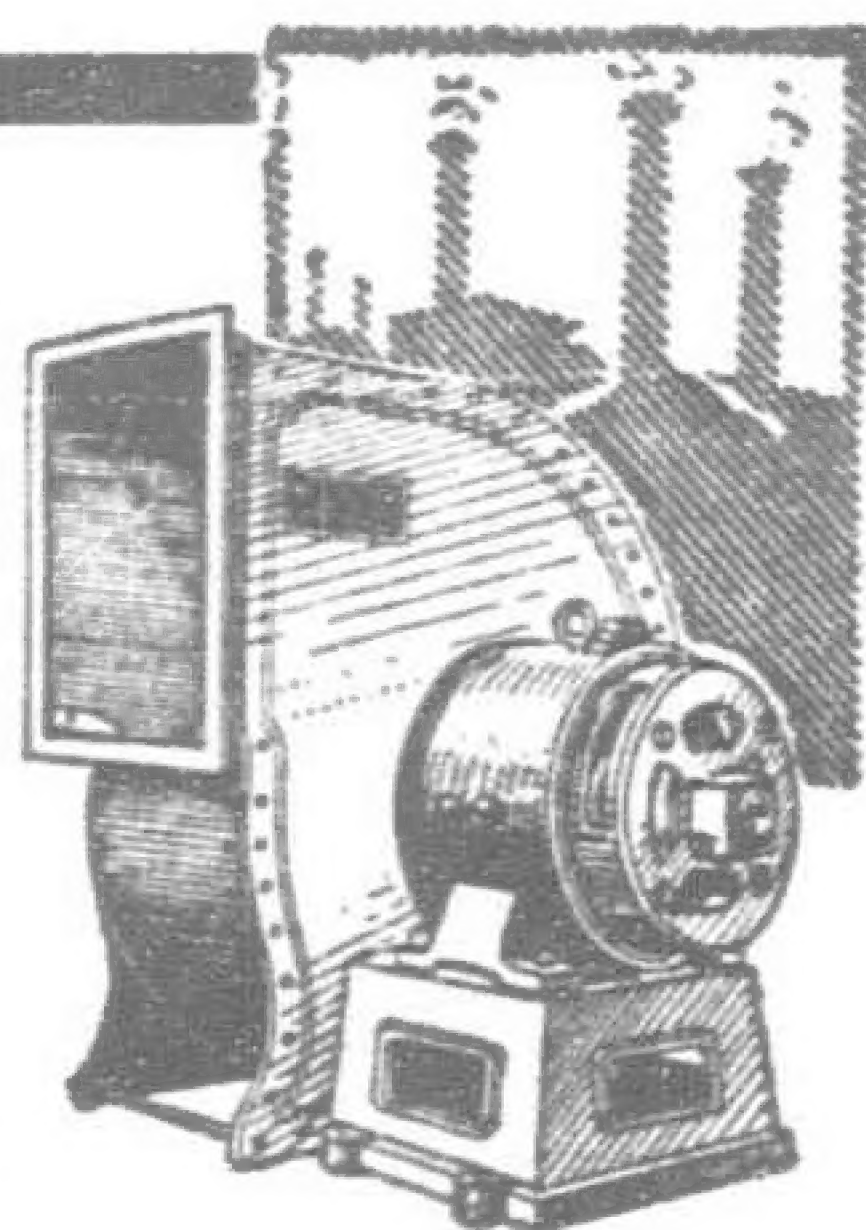
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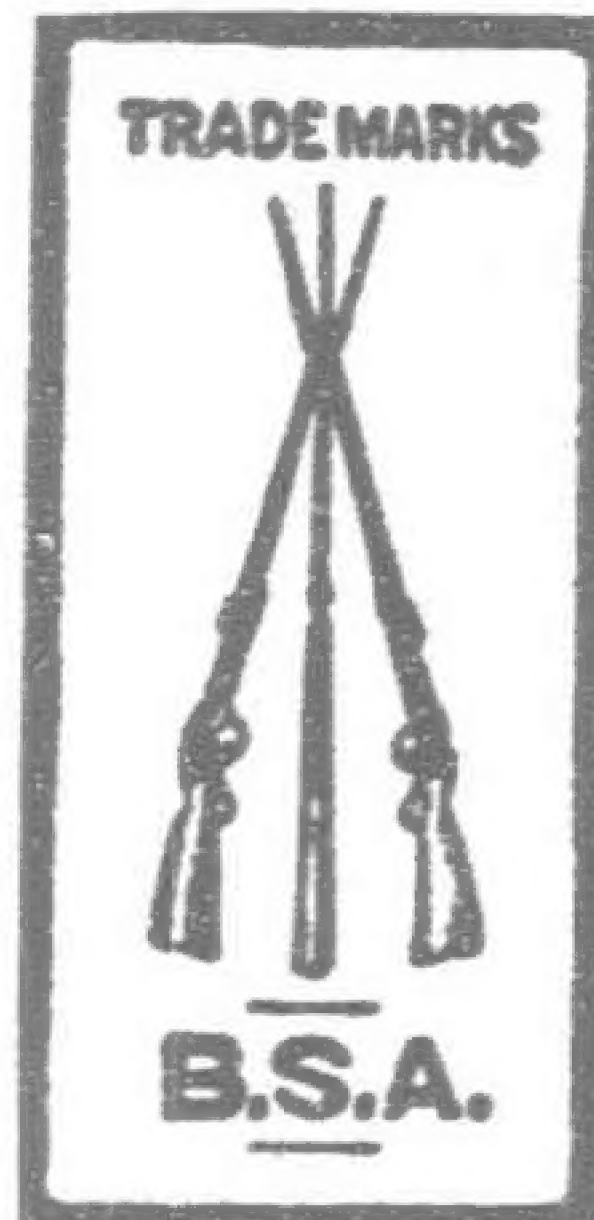
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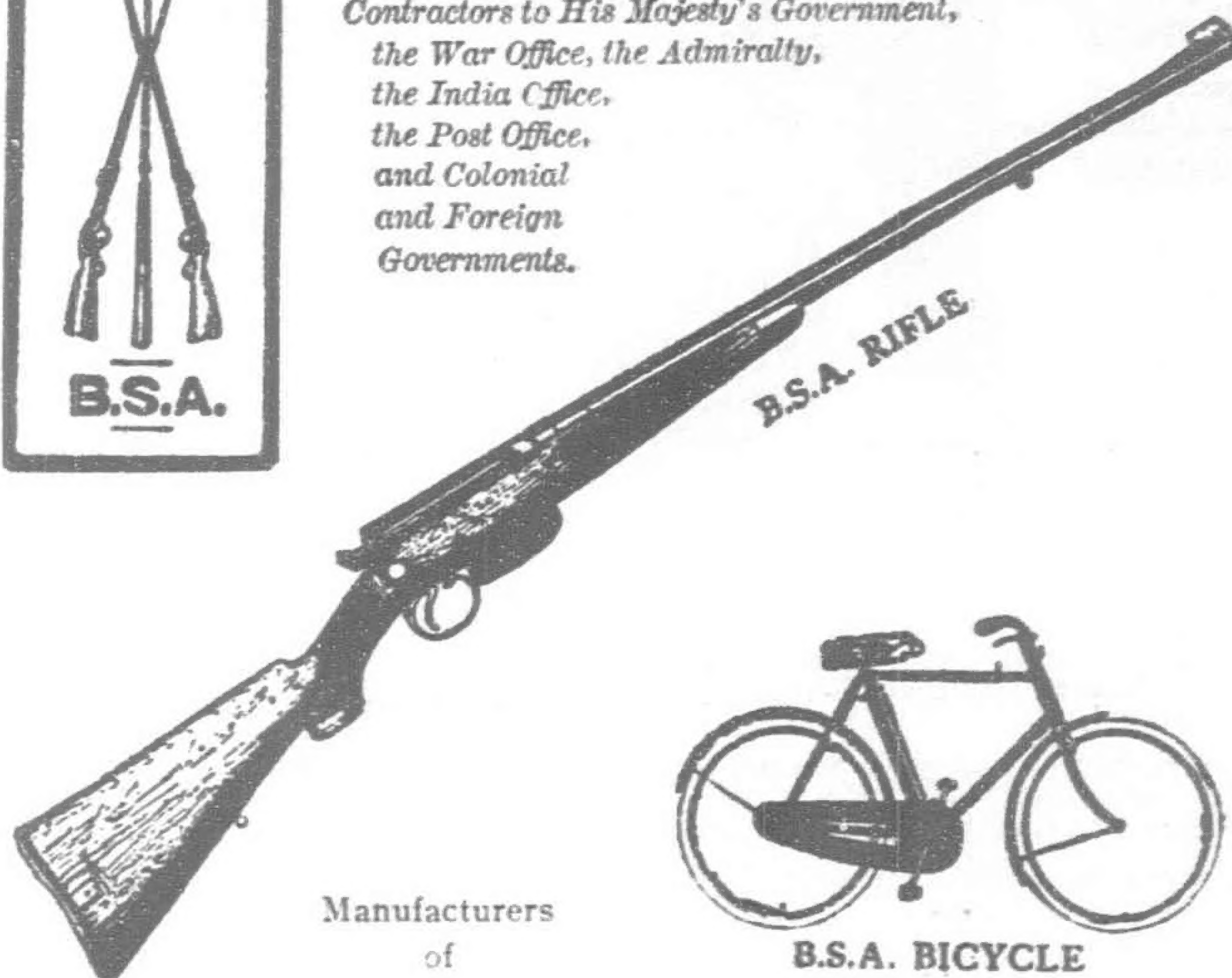
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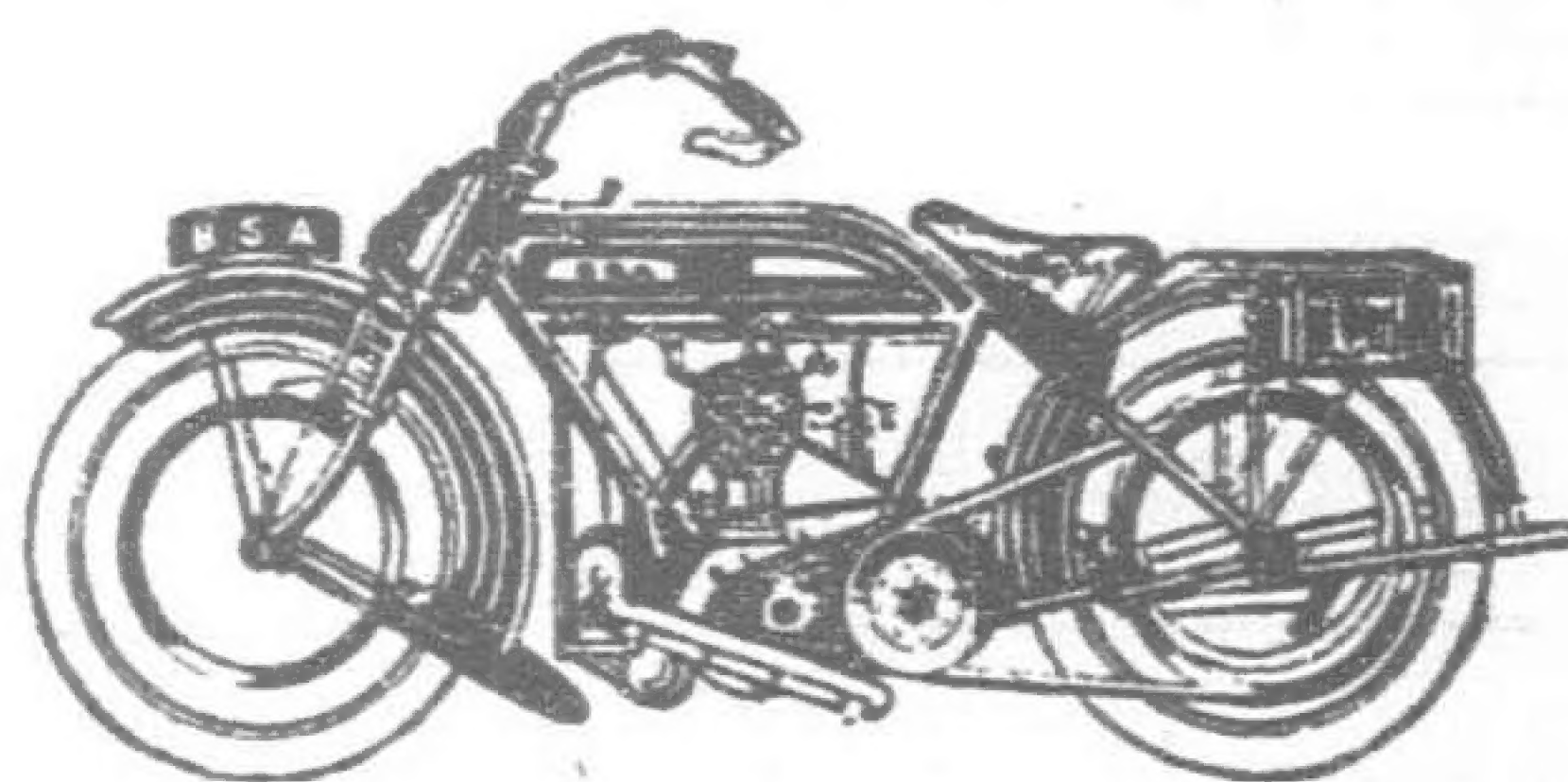
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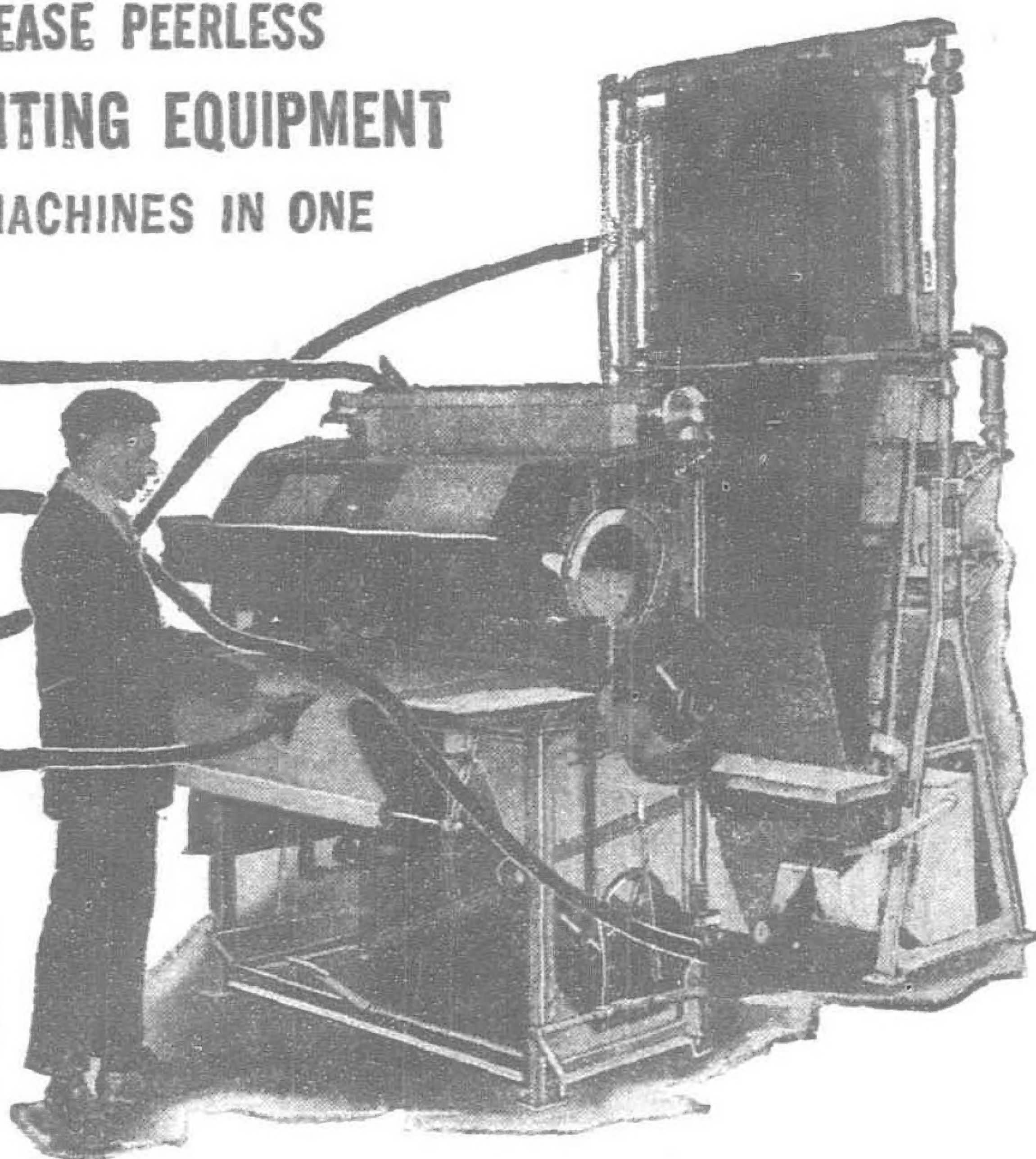
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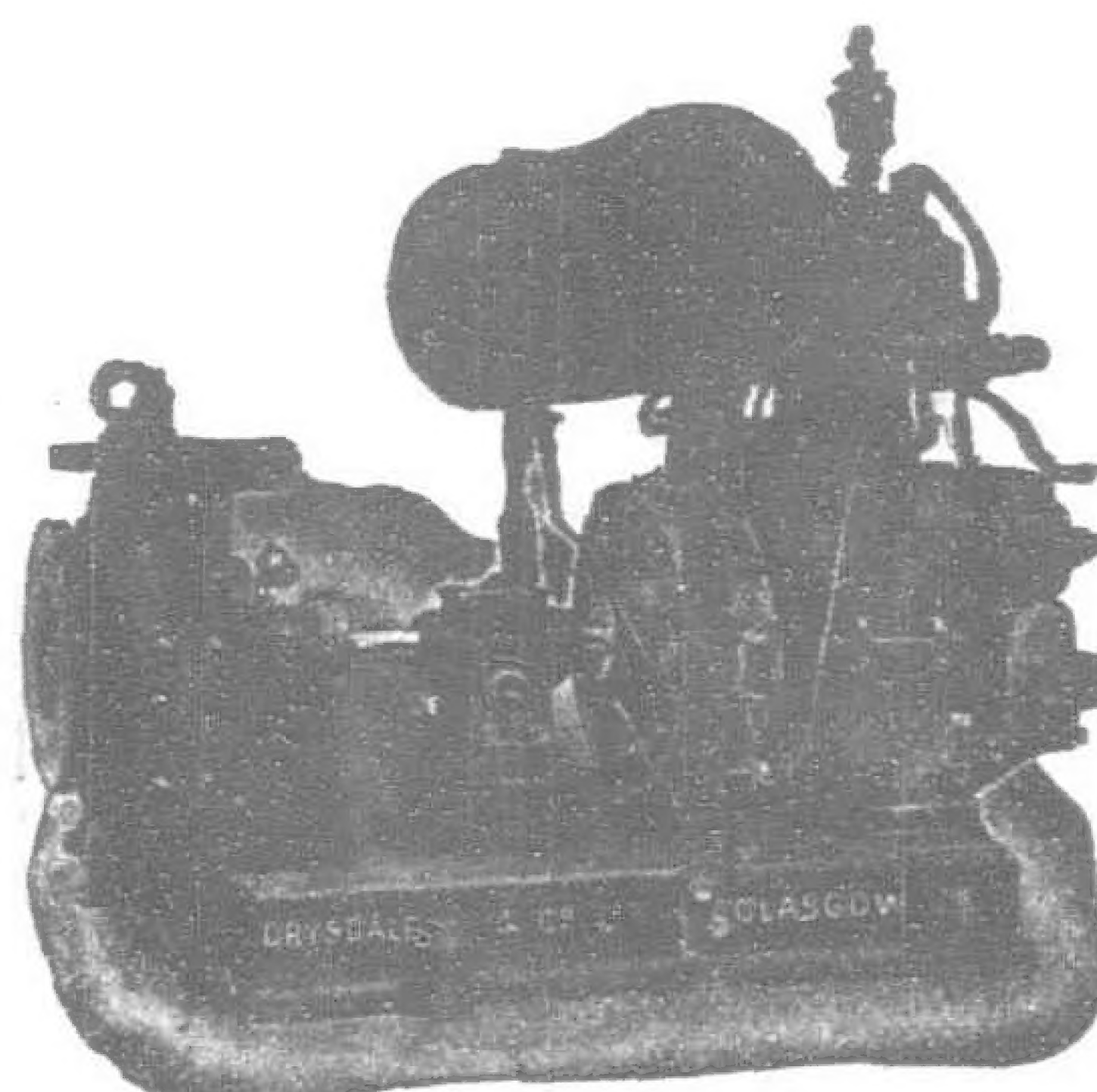
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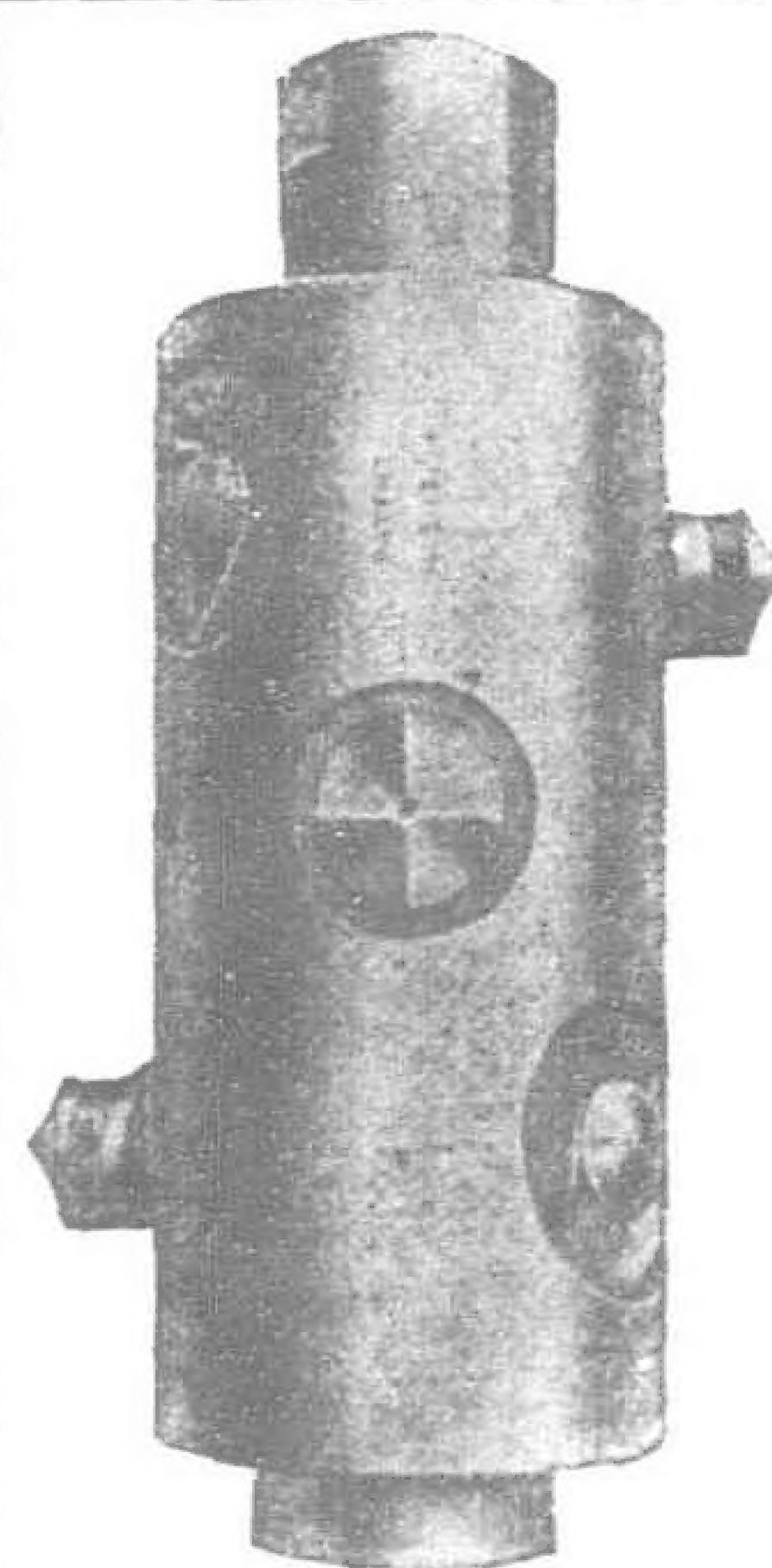
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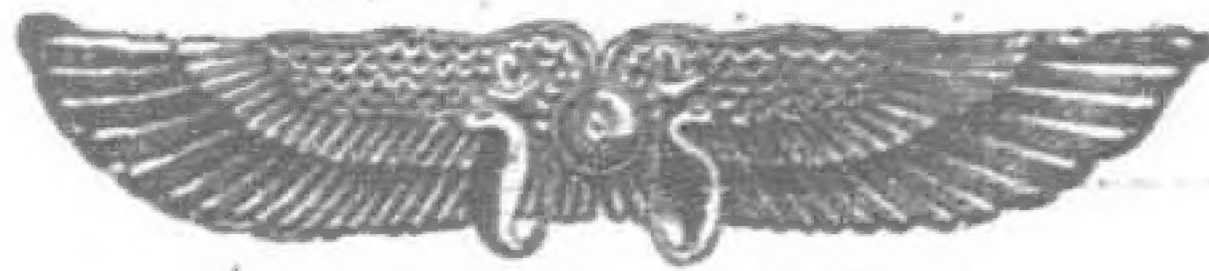
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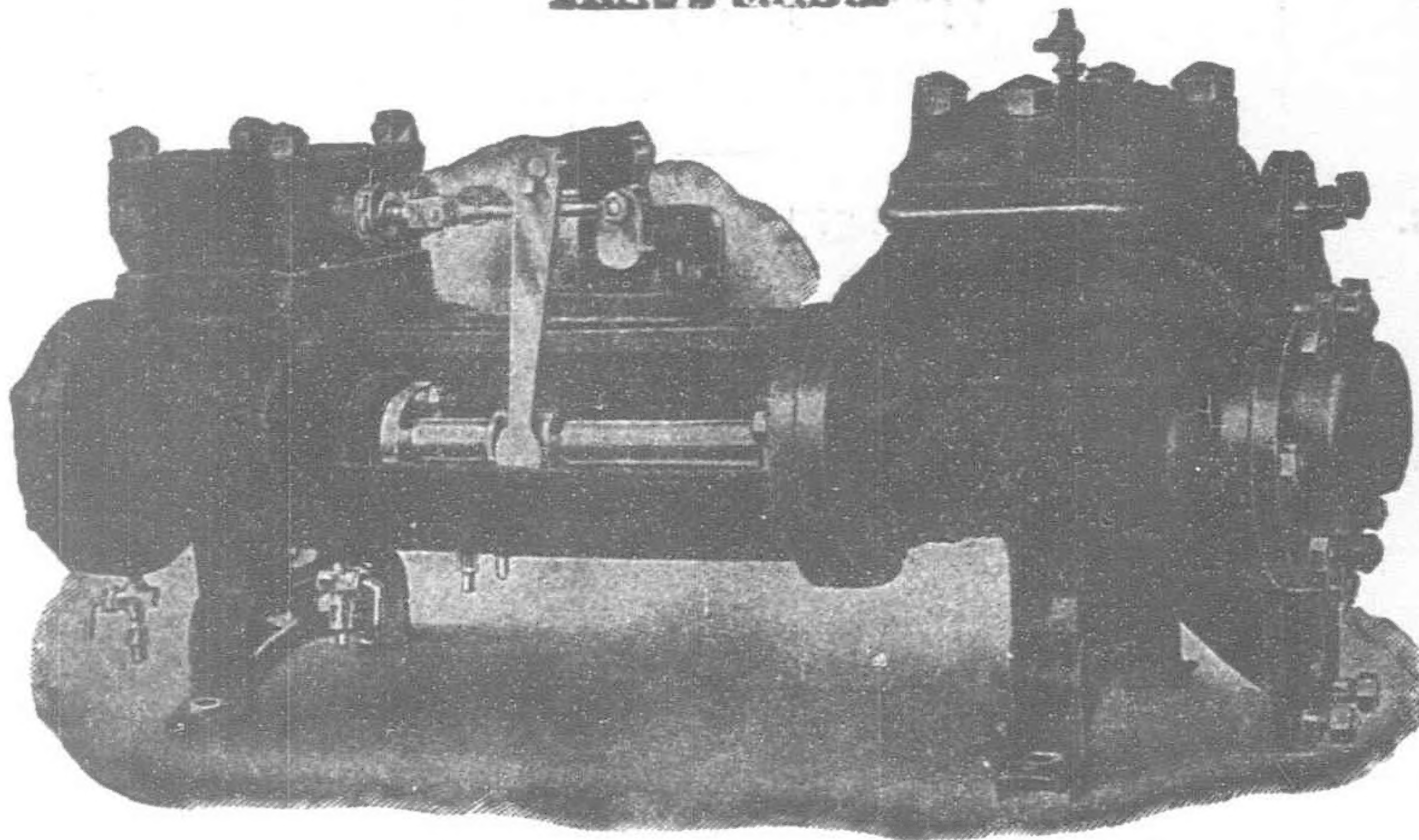
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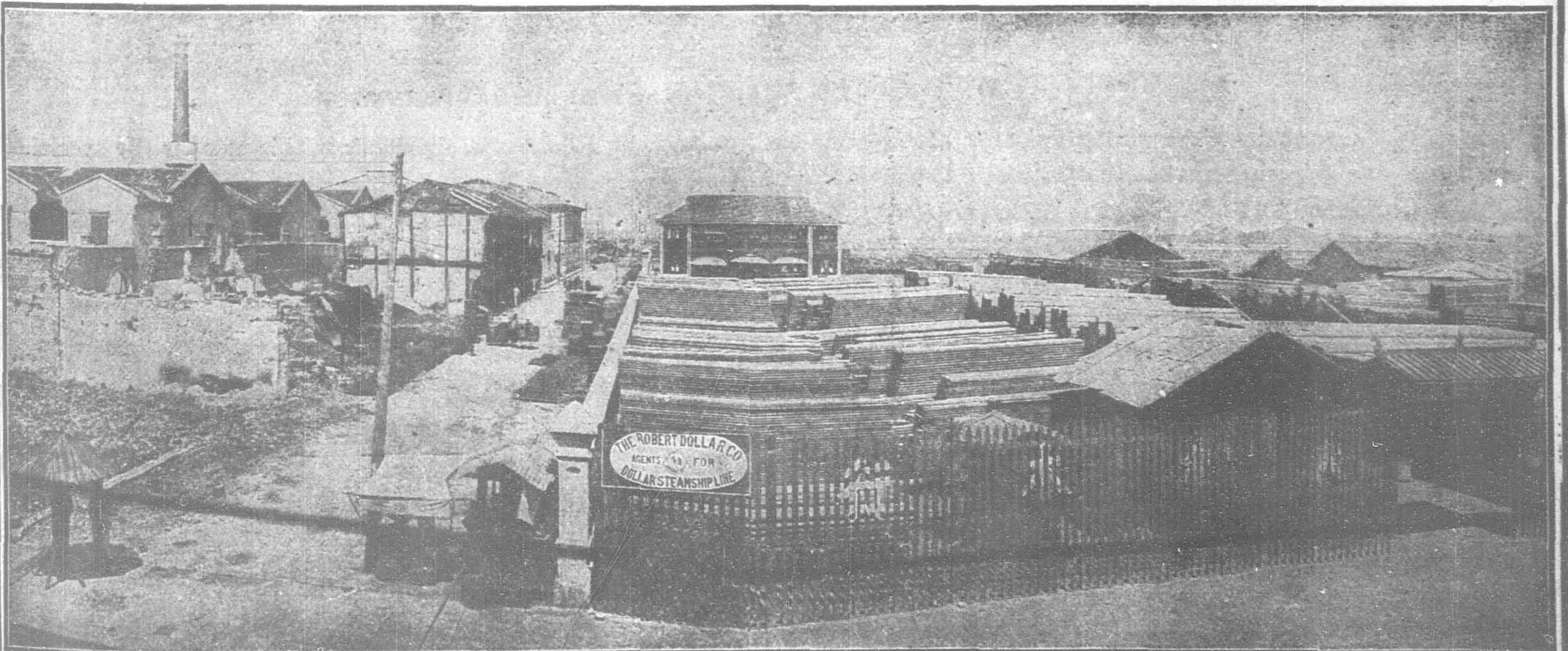
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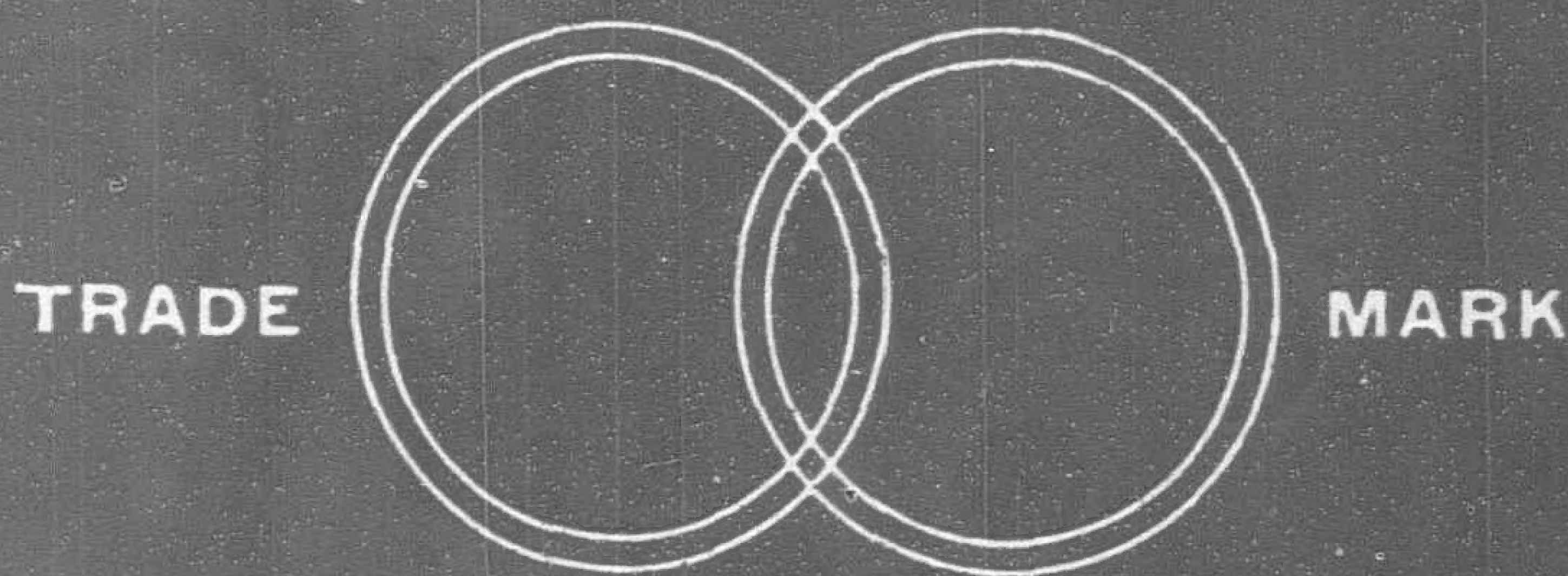
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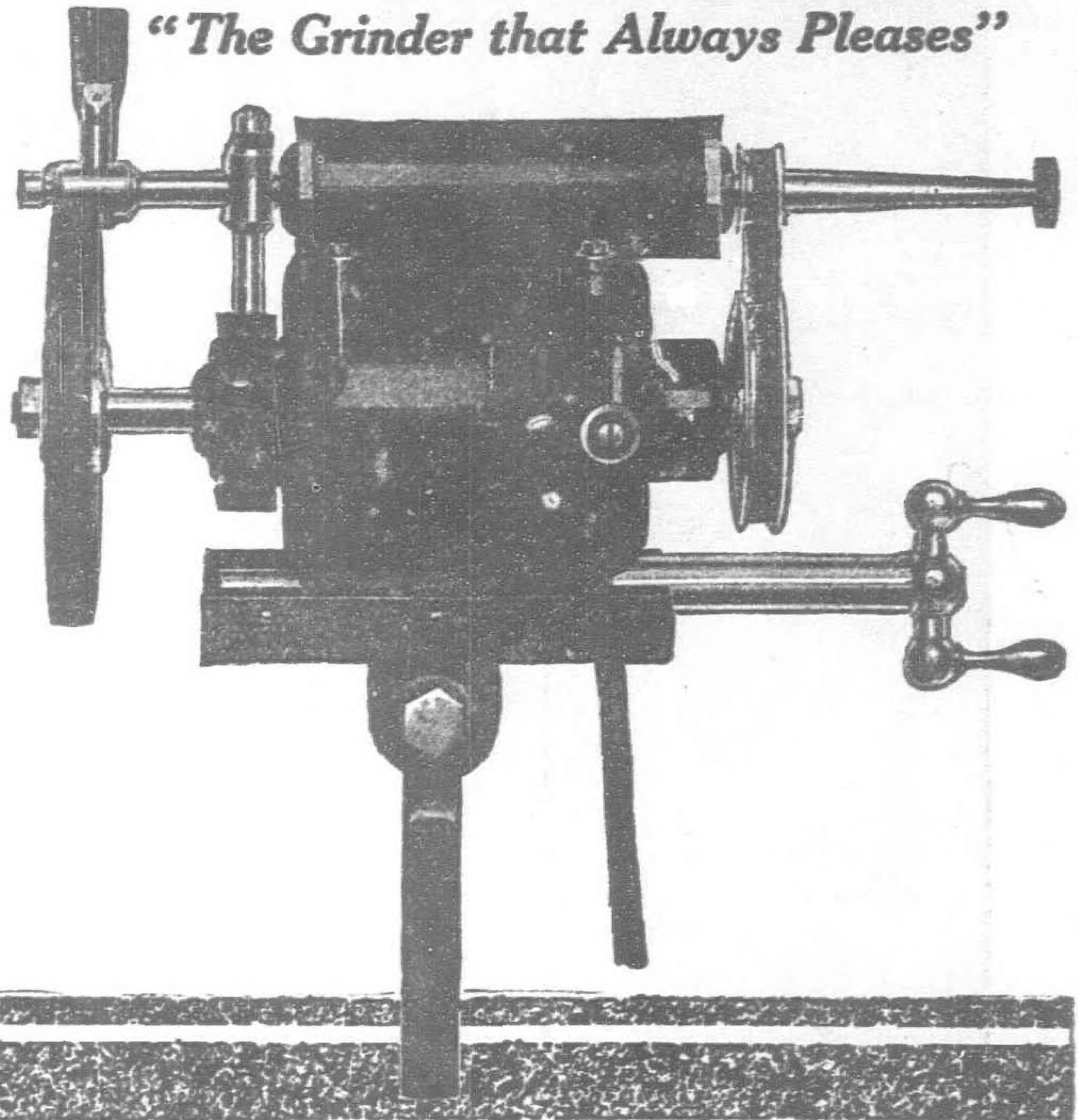
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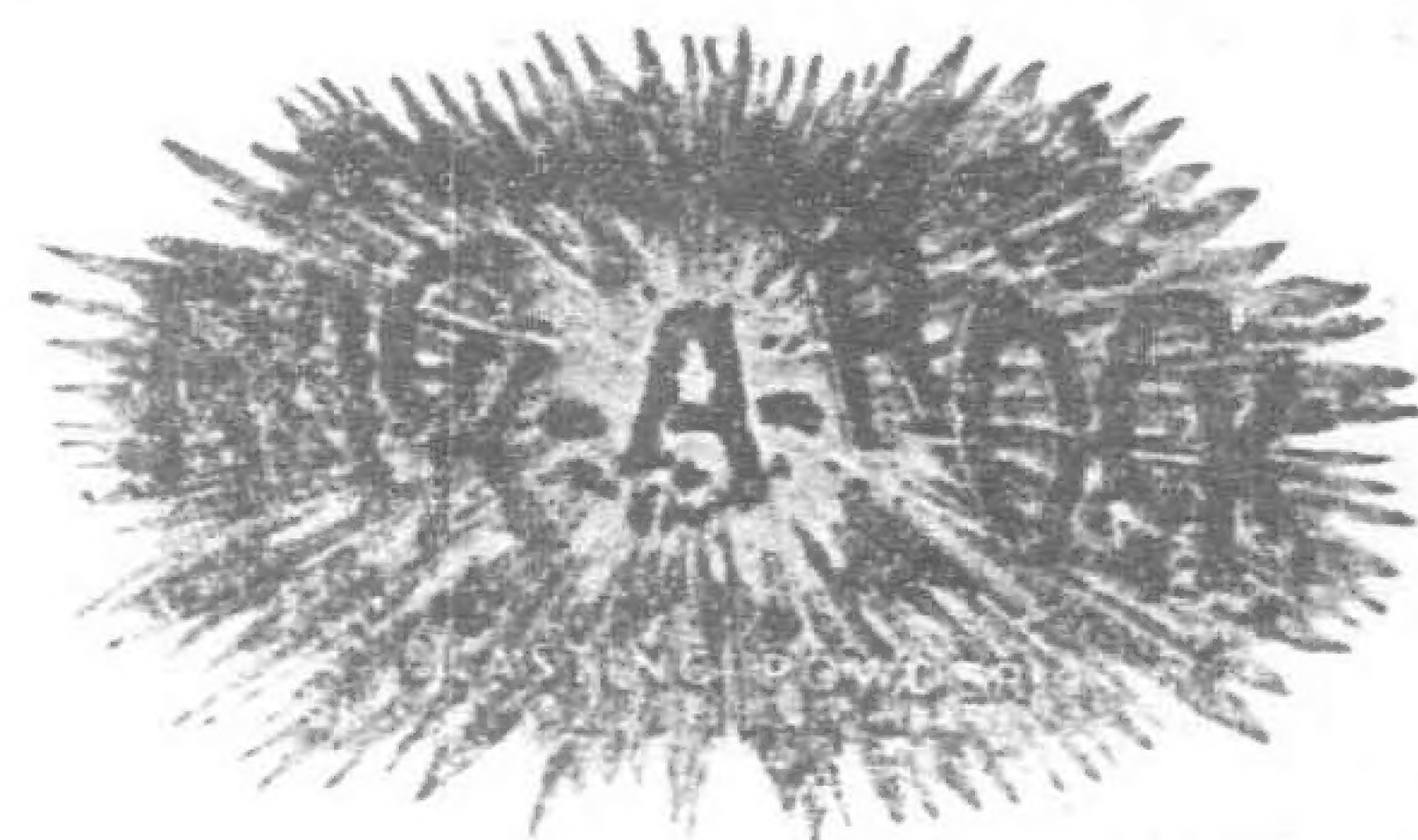
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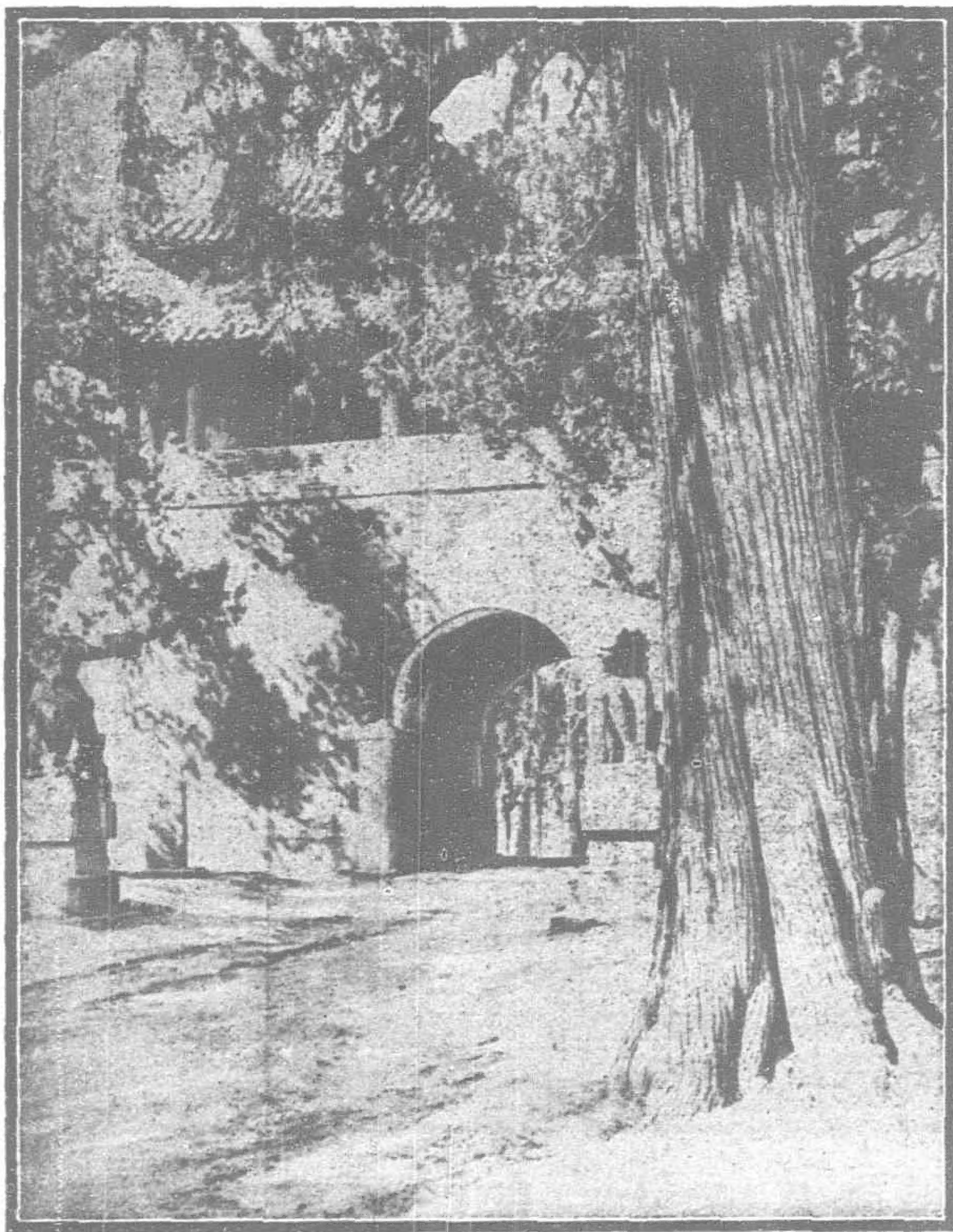
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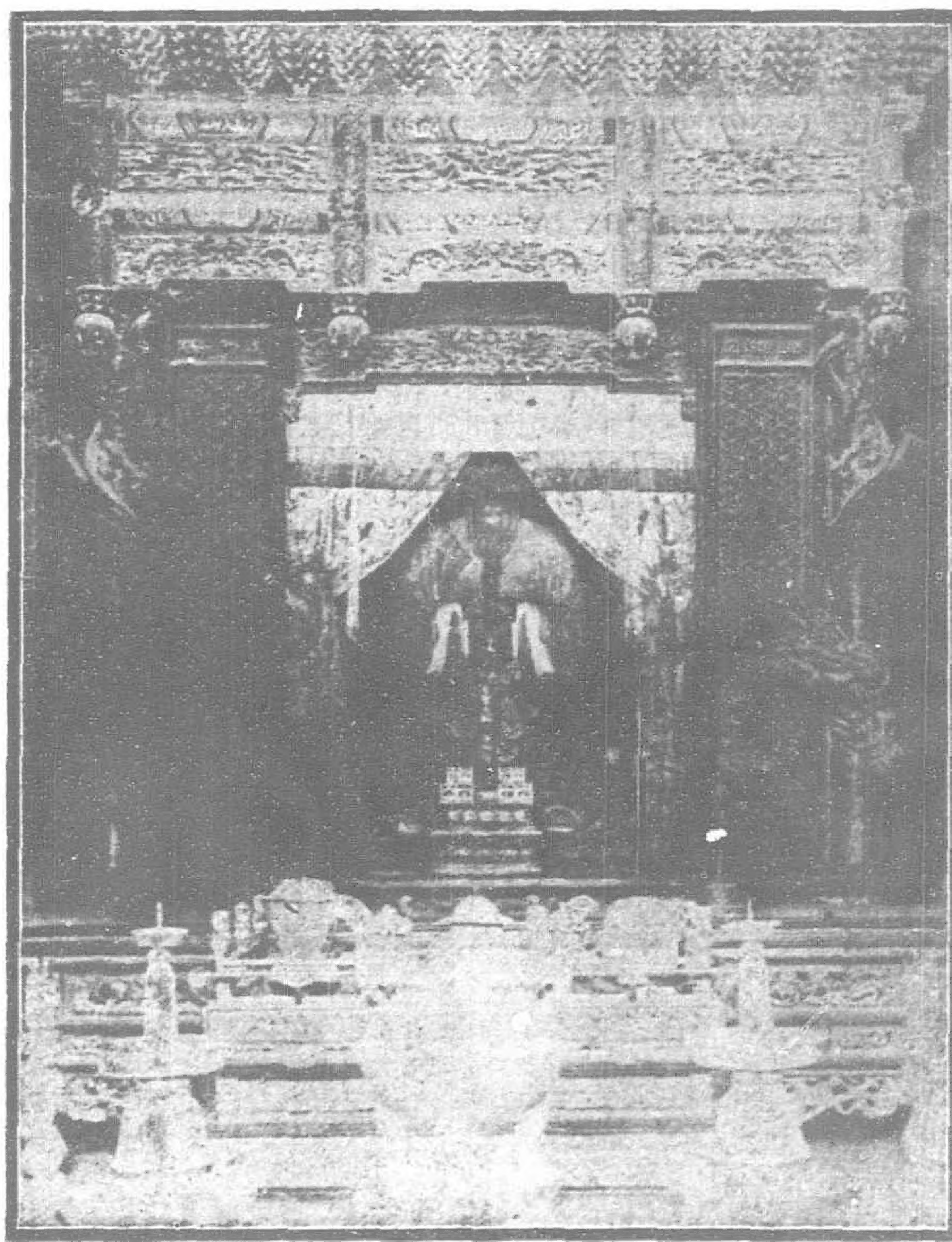
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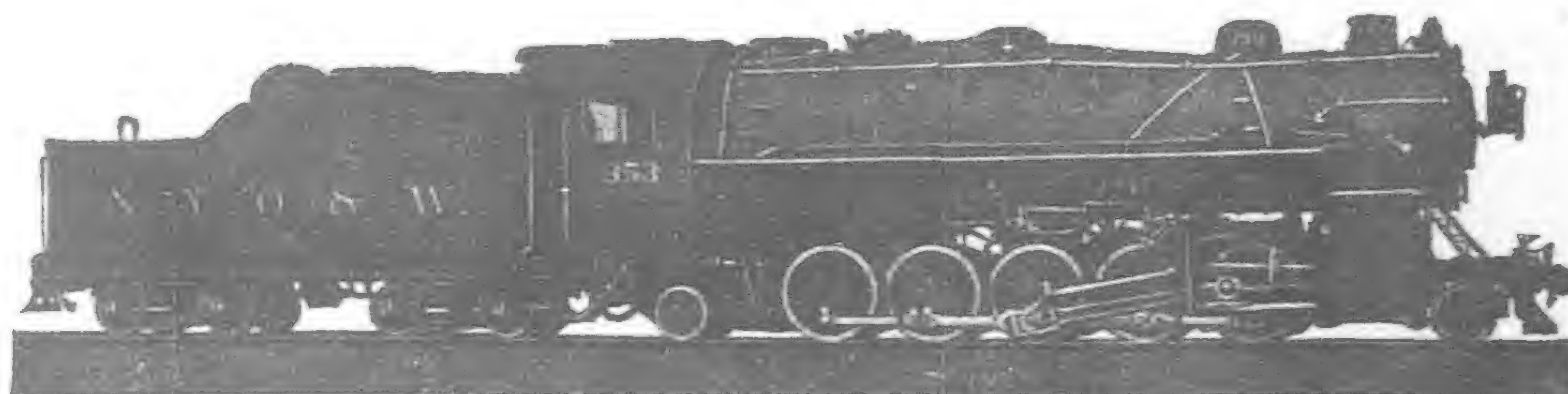
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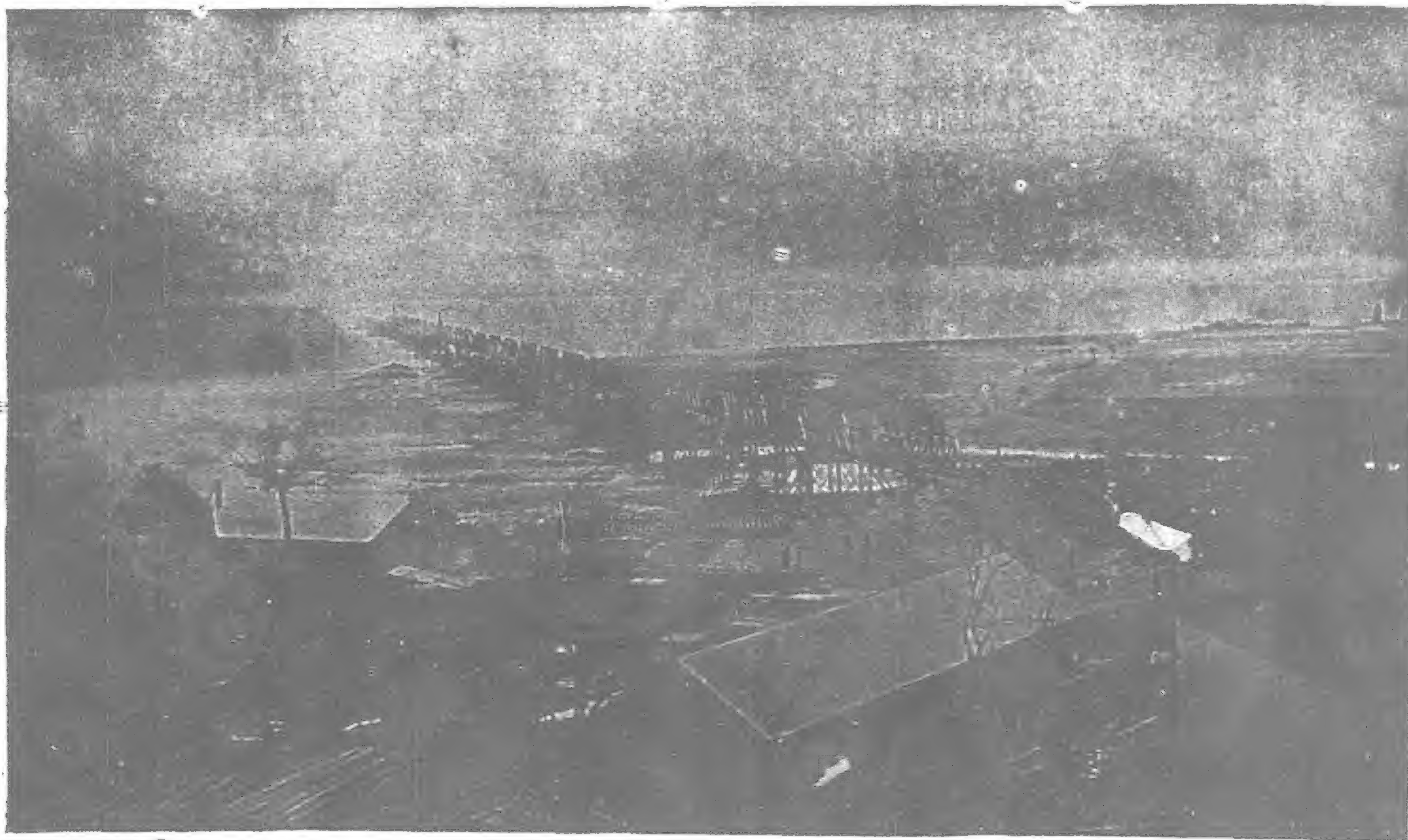
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A weekly express train de luxe leaves Peking every Tuesday, and Hankow every Friday, making the trip of over 700 miles in less than thirty hours.

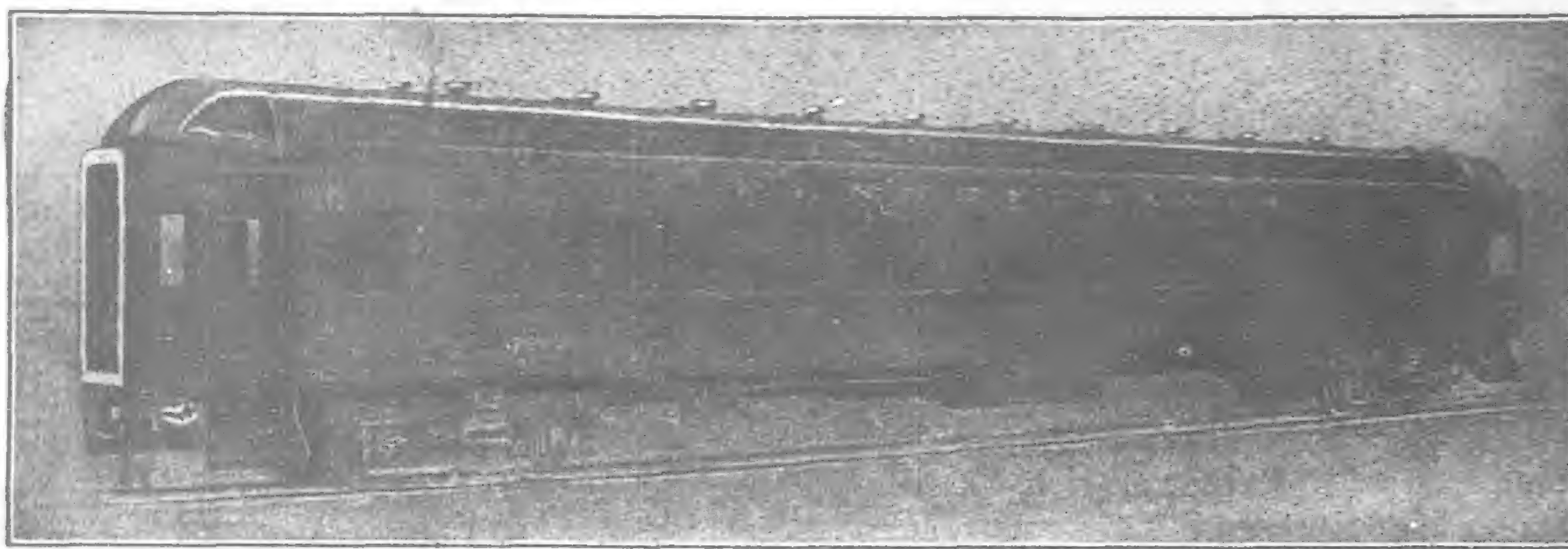
For information apply to any office of the International Sleeping Car Co. or Thos. Cook and Sons.

American Car & Foundry Company

CHICAGO GENERAL OFFICES
165 BROADWAY ST. LOUIS
NEW YORK

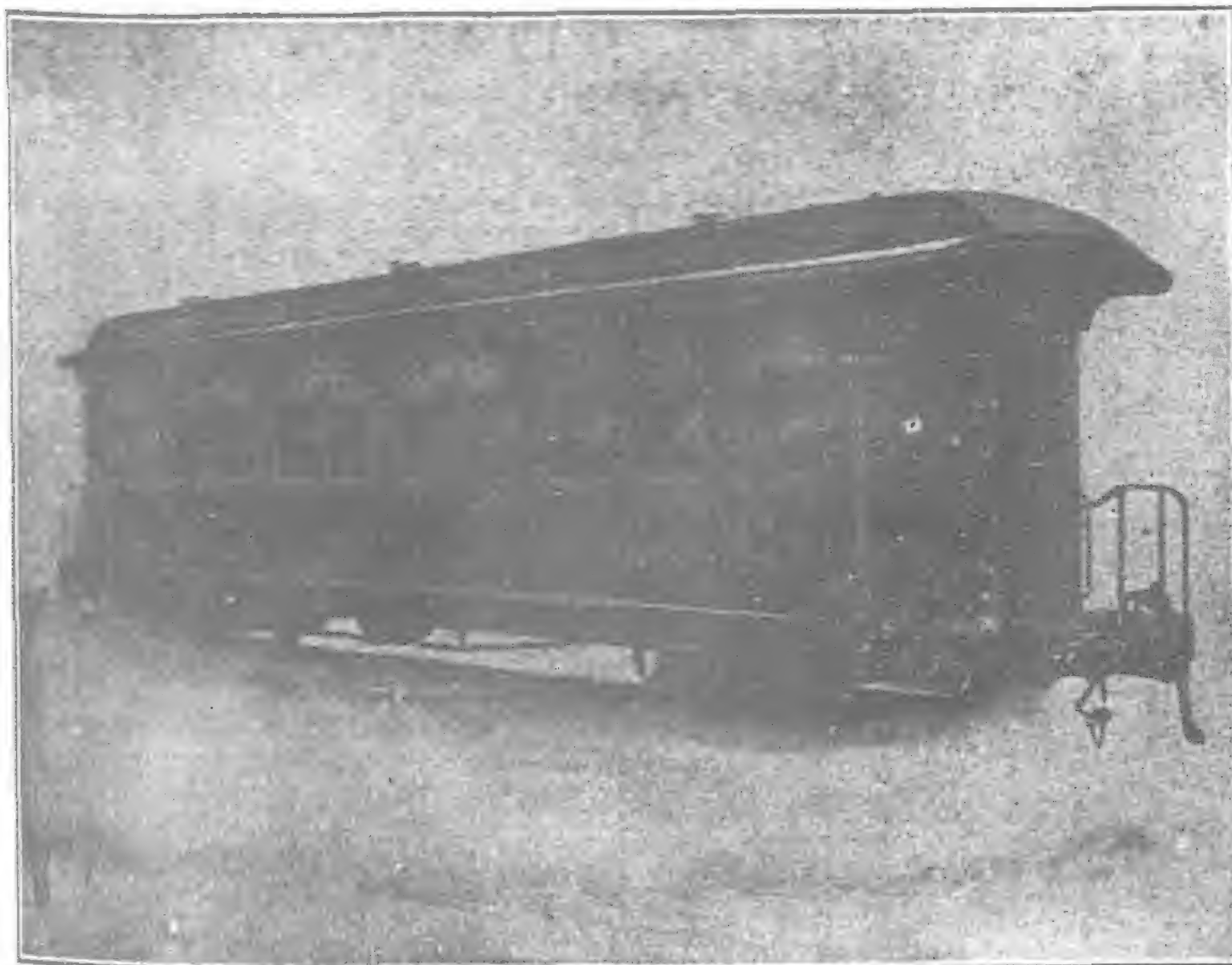
CAR BUILDERS

OUTPUT { 150,000 FREIGHT CARS } PER
 { 1,500 PASSENGER CARS } ANNUM
 { 2,000,000 CAR WHEELS }



AMERICAN ALL STEEL FIRST CLASS PASSENGER CAR

Gauge 4'-8" (1.435 M.). Body Length 70'0" (21.336 M.). Places 88. Weight 115,000 lbs. (52,200 Kilos.)



FIRST CLASS COACH FOR CHILDIAN STATE RAILWAYS

Gauge 23 1/4" (60 C.M.). Body Length 31'-9" (9,677 M.). Width 6'-4" (1,930 M.). Places 20; Weight 20,600 lbs. (9,400 K.G.)

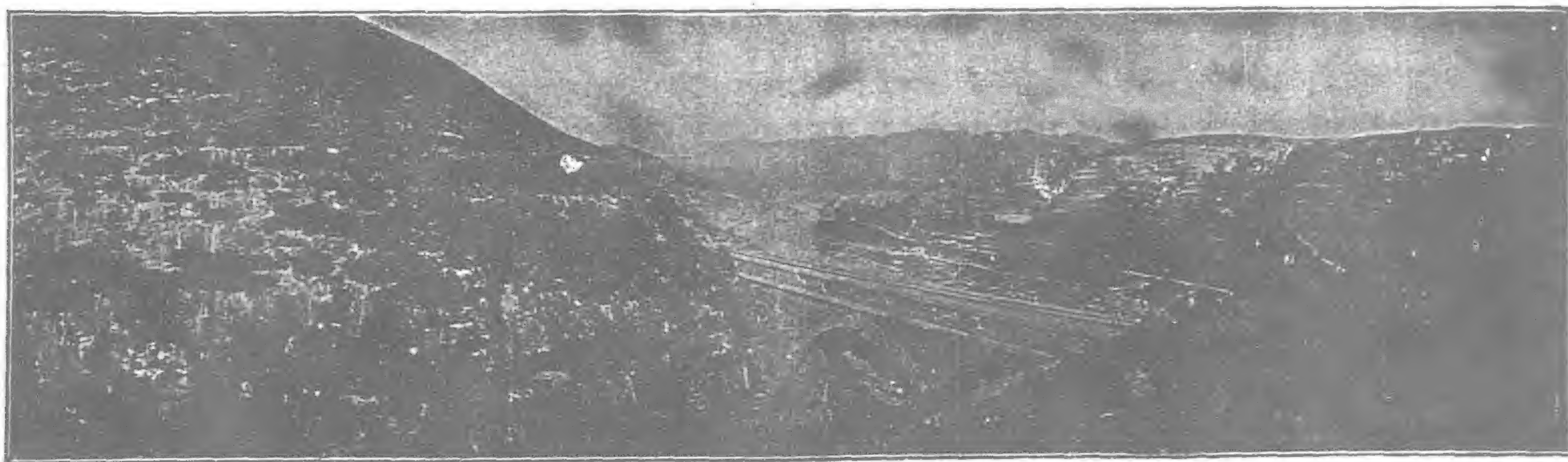
Export Representative

American Car and Foundry Export Company
165 BROADWAY NEW YORK

Chinese Government Railways

The Cheng-Tai Railway

(CHINESE GOVERNMENT SHANSI LINE—CHENGTINGFU TO TAIYUANFU)

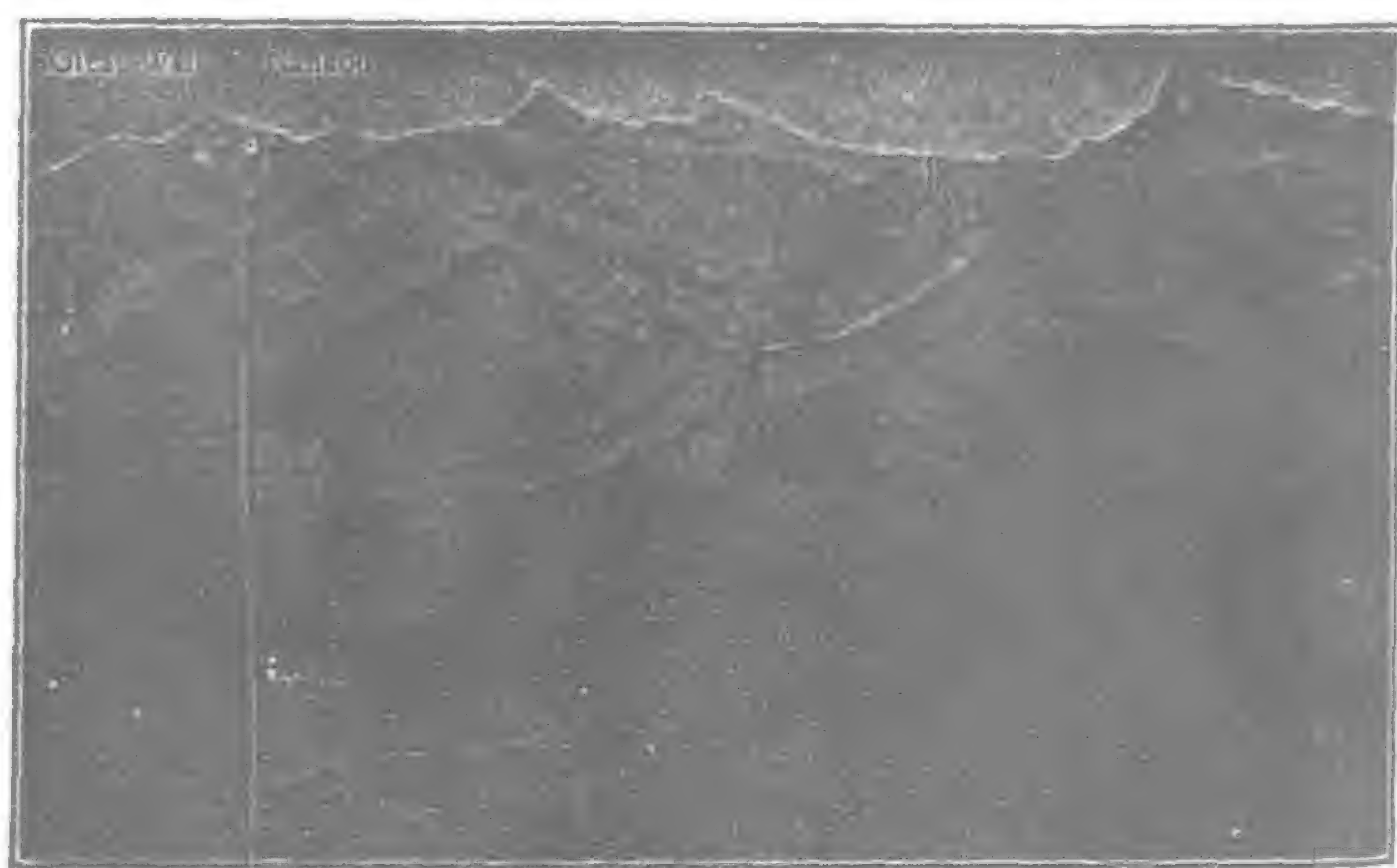


VIEWS ALONG ROUTE OF CHENG-TAI RAILWAY

The trains of this line connect with the through service of the Peking-Hankow Railway, affording Travellers the opportunity of seeing the most picturesque part of China. The line passes through a mountainous section of country, rich in Mineral Resources to the Provincial Capital of Shansi at Taiyuanfu. This interesting city is a great educational center, and famous for the fine quality of its artistic embroideries.

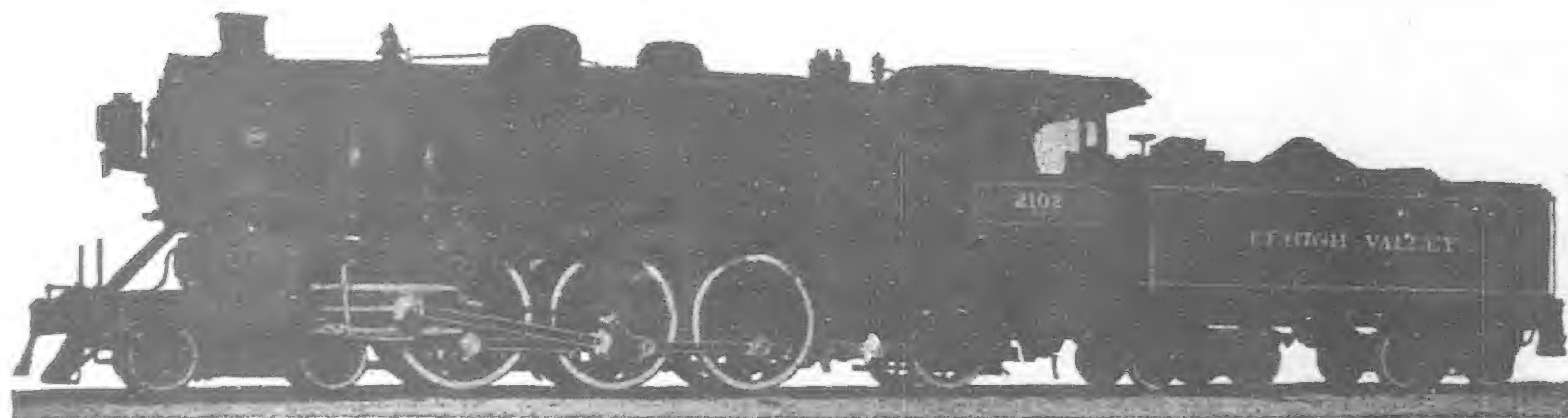
The Peking-Kalgan Line

"THE ROAD TO THE GREAT WALL"



This line follows the ancient caravan route and military highway from Mongolia into China by the way of the historic Nankow Pass. This pass is the Key to Peking, and Kalgan is the gate of the Country. From here the great camel caravans set out on their long journeys across Mongolia to Siberia and Central Asia. This old frontier mart, retaining its time-honored characteristics, one of the most interesting sights of the Old World, is made accessible by the new railway. The line also carries the passenger in two hours from Peking to Nankow, when the Great Wall of China and the Ming Tombs may be seen. A foreign hotel is operated by the railway authorities at Nankow, where chairs and guides may be secured for the Tombs.

Pacific Type Locomotives



BUILT FOR LEHIGH VALLEY R. R. Co.

Cylinders, 27" x 28"

Driving wheels, diameter, 73"

Steam pressure, 205 lbs.

Grate area, 75 sq. ft.

Water heating surface, 4,103 sq. ft.

Superheating surface, 980 sq. ft.

Weight on driving wheels, 197,200 lbs.

Weight, total engine, 301,500 lbs.

Tractive force, 48,700 lbs.

Conditions on the Lehigh Valley favor the use of heavy Pacific type locomotives as illustrated above. These engines are used in fast freight service on the low grade sections of the line, hauling trains of 2000-2400 tons; and they are also handling through express traffic over the Wyoming Division, where grades are steep, the maximum being 96 feet per mile. The equipment of these locomotives includes superheaters, brick arches, mechanical stokers, and power reverse gears.

Pacific type locomotives are working the greater part of the fast passenger traffic on American railways. Where track conditions permit heavy wheel-loads to be carried, as is the case on the Lehigh Valley, locomotives of this type can develop sufficient tractive force to start heavy steel trains, while their steaming capacity permits running at sustained high speed.

Thirty locomotives of the design illustrated, have been built, and twenty additional are under construction.

THE BALDWIN LOCOMOTIVE WORKS

Cable Address:—"BALDWIN, PHILADELPHIA"

PHILADELPHIA, PA., U. S. A.

Agents for China, Hongkong, Philippine Islands, Indo-China, Straits Settlement, and Siam:—ANDERSEN, MEYER & Co., Ltd. Head Office, SHANGHAI; Branches: TIENTSIN, PEKING, KALGAN, HARBIN, HANKOW, HONGKONG, CHANGSHA, TSINAN, and VLADIVOSTOCK.

Agents for Japan:—SALE & FRAZAR, Ltd., TOKYO.

Chosen Railways

Most Important Link in the Round-the-World Routes via Siberia.
Safest and Quickest Overland Route between Europe or China and Japan.

Only 13 hours, Sea Passage between the Continent and Japan.
Best Opportunities for studying Unique Conditions in the Far East.



Chosen-Manchuria Express

Fusan-Keijyo (Seoul)-Mukden-Changchun

Weekly Service. Most Up-to-date Accommodation: 1st and 2nd Class Sleeping Cars and a Dining Car.

CONNECTIONS:

With the Trans-Siberian Express.
With the Tokyo-Shimonoseki Train de Luxe.
With the Peking-Mukden Train de Luxe.

Daily Express

Fusan-Keijyo-Antung

Twice a day Service, taking all class Cars, besides 1st and 2nd Class Sleeping Cars (Keijyo-Antung, 1st class car only) and a Dining Car.

CONNECTIONS:

With trains on the South Manchuria Ry.
With express trains on the Japanese Rys.

Through Traffic

Stations open to through traffic are as follows:—

South Manchuria Railway.—

Dairen, Changchun, Mukden, Yingkou, etc.

Chinese Eastern Railway.—

Tsitsihar, Manchuria and Harbin.

Chinese Government Railways.—

Hsinmingfu, Shanhai-kuan, Peking, Tientsin, Shanghai, Nanking, Tsinanfu, Hankow, Nankow and Kalgan.

Russian State Railways.—

Irkutsk, Odessa, Warsaw, Moscow and Petrograd.

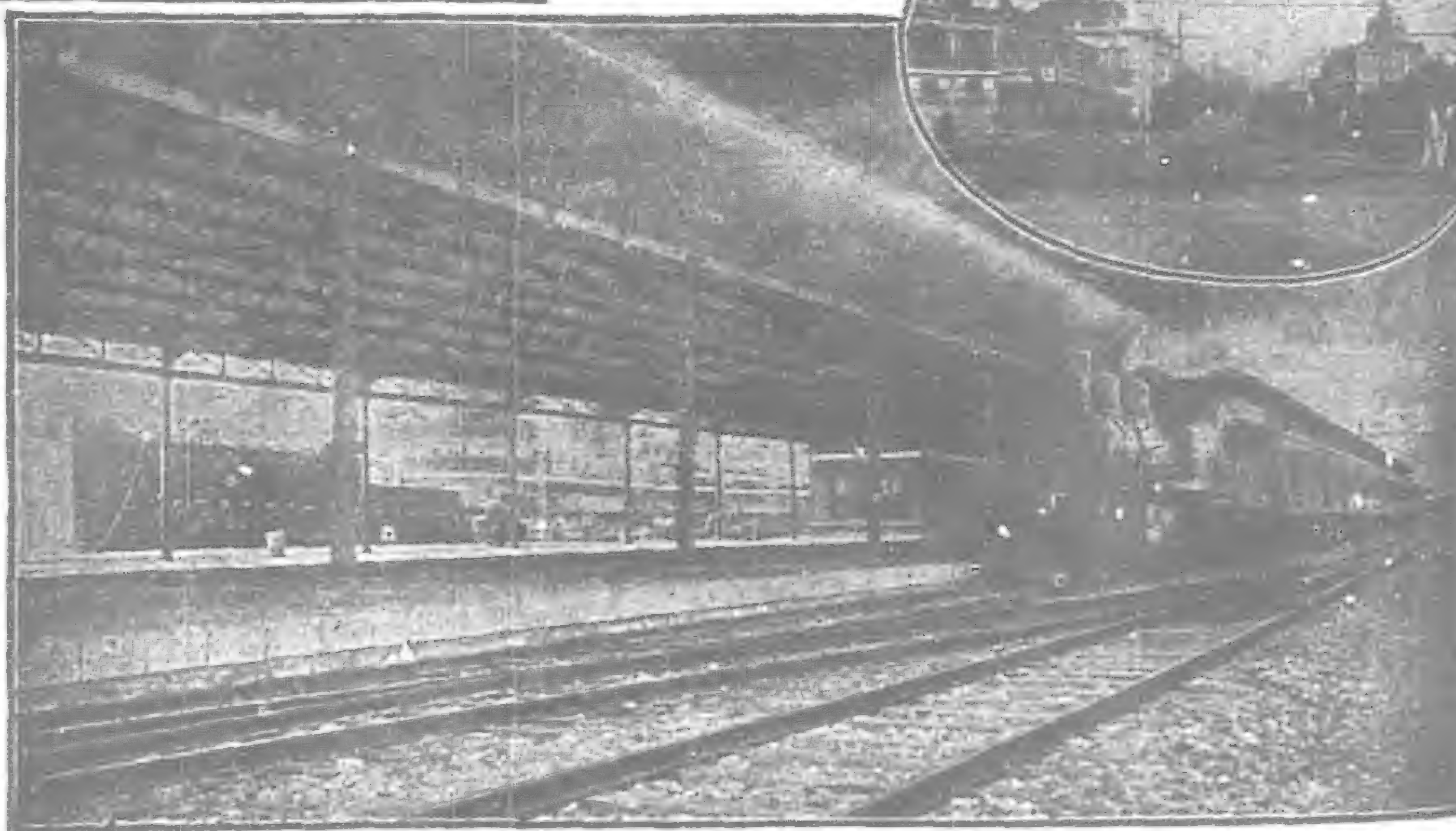
Chosen Railways.—

Fusan, Keijyo (Seoul), Heijyo, †Jinsen and †Chinnampo.

Japanese Railways.—

(via Chosen)
Tokyo, Yokohama, †Nagoya, Kyoto, Osaka, Kobe, Shimonoseki, Moji and Nagasaki.

† No through traffic to or from points of the Chinese Eastern Railway and the Russian State Railways.



Fusan Pier

A scene in Keijyo (Seoul)

Ticket Agencies

The International Sleeping Car Company; Messrs. Thos. Cook & Son; The Nordisk Resebureau.

Hotels

Under the Direct Management of the Railway Bureau.

CHOSEN HOTEL AT KEIJYO (Seoul).—Cable Add: "CHOHO" 80 bedrooms mostly with bath; Motor-cars meet guests at the station.

STATION HOTELS AT FUSAN AND SHINGISHU.—The most convenient and comfortable stopping places on the upper floors of the two station buildings.

FOR FURTHER PARTICULARS PLEASE APPLY TO

Keijo Office,

South Manchurian Railway Co.,

Tel. Add: "MANTETSU", Keijo.

KEIJO, CHOSEN

Code Used: A.B.C., 5th Edition.

SOUTH MANCHURIA RAILWAY

Important Section in the Overland Route between Europe and the Far East



S.M.R. Co.'s YAMATO HOTEL, DAIREN (THE FINEST HOTEL IN THE FAR EAST).

Save time and Money.

The Quickest, Cheapest, and Safest Route between Europe and the Far East is via Siberia and Manchuria. The South Manchuria Railway Company's Express Trains are equal to the best in Europe and America, and are timed to connect with other Express Trains and Steamers. Sleeping Cars are attached to most of the Ordinary Daily Trains.

How to Reach Shanghai.

Travellers from Europe via Siberia by the Through Express arrive at Dairen in time to catch the S.M.R. Company's Weekly Mail and Passenger Steamer "Sakaki Maru" of the Dairen-Tsingtao-Shanghai Line. This Steamer is turbine driven, equipped with wireless telegraphy, and carries a doctor on board. The "Kobe Maru," which also leaves Dairen weekly, plys direct to Shanghai without calling at Tsingtao.

Important to Travellers and Tourists.

The S.M.R. Co. has established, under its direct management, a series of Yamato Hotels at Dairen, Hoshigaura, Port Arthur, Mukden, and Changchun. All on European lines. Cook and Son's Coupons accepted. Tel. add.: "Yamato"

Health and Holiday Resorts in Manchuria.

The beautiful climate and scenery of Manchuria is fast popularizing it as a health and holiday resort, and special seaside colonies have been established at Hoshigaura (Star Beach), near Dairen, and Ogondai (Golden Beach), near Port Arthur.

Of Interest to Shippers.

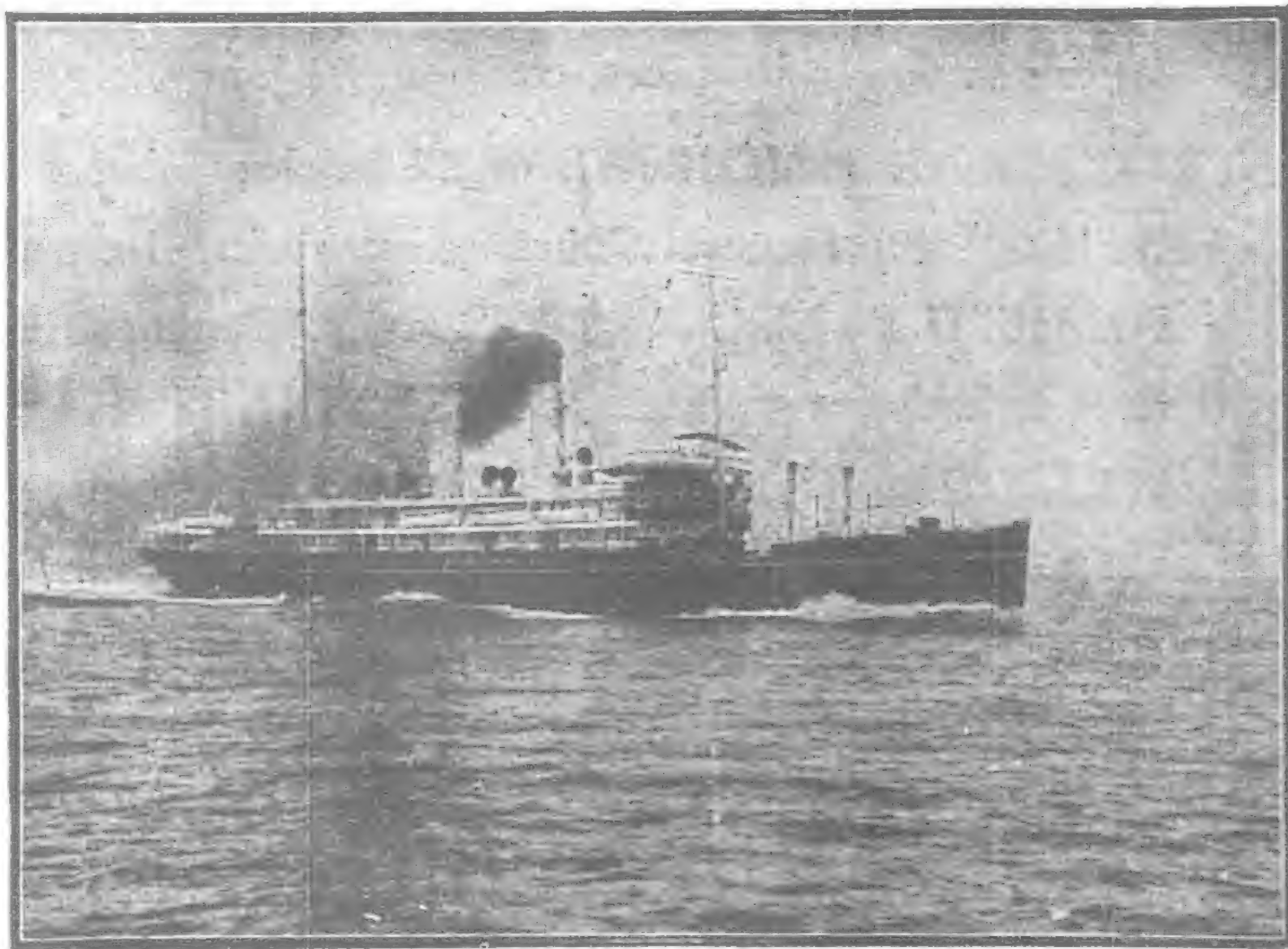
In addition to its Dairen-Tsingtao-Shanghai Liners, the S.M.R. Co. run a fleet of cargo steamers between Dairen and Hongkong, calling at ports en route. Other Steamship Companies have regular services to and from Dairen. Particulars may be obtained from the Manager of the Wharf Office, Dairen.

Best Steaming Coal in the Far East.

Large stocks of the S.M.R. Company's Coal from the famous Fushun Collieries are always kept at Dairen, Port Arthur, Newchwang (Yingkou), and Tientsin Depots, and can also be obtained at Chefoo, Shanghai, Hongkong, Singapore, and Penang. For special contracts apply Manager, Mining Dept., S.M.R. Co., Dairen.

Ticket Agents.

The S.M.R. Company's Railway and Steamer Tickets, Illustrated Guide Books, and Handbooks of Information can be obtained at all the Offices and Agencies of Messrs. Thos. Cook & Son, the International Sleeping Car and Express Trains Co., and the Nordisk Resebureau; the Nippon Yusen Kaisha, Shanghai; the S.M.R. Branch Wharf Office, Shanghai; or direct from the



S.M.R. Co.'s DAIREN-TSINGTAO-SHANGHAI LINER, "SAKAKI MARU."

South Manchuria Railway Company, Dairen.

Tel. Add.: MANTETSU.

Codes: A.B.C. 5th Edition, A.L. & Lieber's.

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Exporters of the products of

CARNEGIE STEEL Co.

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STEEL SHEETS, plain and corrugated; galvanized and painted. Galvanized sheets "APOLLO" brand. Black sheets "EAGLE" brand. Copper bearing sheets "KEYSTONE" brand, either black or galvanized.

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PIPE, black and galvanized wrought, for steam, gas and water; American or English Standards. Lapwelded steel BOILER TUBES. CASING, TUBING and DRIVE PIPE. Oil and Gas line Pipe. CONVERSE and MATHESON lead joint pipe. TUBULAR STEEL POLES. Lapwelded and seamless CYLINDERS. SEAMLESS STEEL TUBING.

STEEL RAILS (Vignole) of all sections. Groove and guard rails for tramways. RAILS and ACCESSORIES. SPECIAL TRACK WORK, points and crossings. Manganese Steel Insert and Solid Manganese Steel for electric and steam railroads. Portable SWITCHES, switch stands, rail braces, compromise joints, etc. STEEL RAILWAY TIES (Sleepers).

STRUCTURAL MATERIAL of all kinds; Joists, Channels, Tees, Angles, etc., for Bridges, Buildings and General Constructive work. Best quality BESSEMER and BASIC OPEN HEARTH STEEL BARS, Rounds, Squares, Flats. Ovals and Hexagons. Special bolt, rivet and shafting steel. STEEL SHEET PILING, STEEL MINE TIMBERS, OIL WELL DERRICKS, SCHOEN SOLID FORGED AND ROLLED STEEL WHEELS. VANADIUM STEEL. GEAR BLANKS.

FORGED AXLES of highest quality for Locomotives, Railroad and Tramway Cars. FORGINGS.

HOOPS for barrels and casks, and TIES for haling.

We Solicit Inquiries

accompanied by exact specifications stating quantity

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Branch Offices at

ANTWERP	BRUSSELS	GLASGOW	MONTREAL	SANTIAGO	TORONTO
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BATAVIA	CALCUTTA	JOHANNESBURG	PARIS	SAO PAULO	VANCOUVER
BIRMINGHAM	CAPE TOWN	LIMA	PETROGRAD	SOERABAYA	WINNIPEG
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MILD STEEL PLATES for ships' tanks, stacks and boilers. Flange and fire-box steel. Checkered plates.

WIRES, baling and fencing; all classes of coated and uncoated for manufacturing purposes. Genuine "IOWA," "GLIDDEN" and "WAUKEGAN" barb wire. Fence and netting STAPLES. Tinned mattress, broom and bottling wire. Woven Wire Fence. FABRIC FOR REINFORCING CONCRETE. Wire Nails and Tacks of all descriptions.

INDESTRUCTIBLE CYLINDRICAL STEEL FENCE POSTS.

HORSE and MULE SHOES. COLD DRAWN SHAFTING and COLD ROLLED PLATES for deep stamping, etc.

AERIAL TRAMWAYS. Bleichert System. Locked coil track cable, locked wire cable and smooth coil track cable for Aerial Tramways.

IRON and STEEL WIRE ROPE, bright and galvanized for all purposes. Bright and galvanized SASH CORD, galvanized CLOTHES LINES. Bare and insulated COPPER WIRE and CABLE of every description.

COPPER RAIL BONDS, solid and stranded for electric railways.

WEATHER PROOF INSULATED telephone and signal WIRE. Galvanized telegraph and telephone wire.

ROUND and FLAT WIRE STEEL SPRINGS. PIG IRON, COAL and COKE.

FABRICATED MATERIAL for railway bridges, highway bridges, turntables, transfer tables, barges, steel chimneys, steel buildings, mill buildings, office buildings, tanks, towers, transmission towers, trestles, cylinder piers.

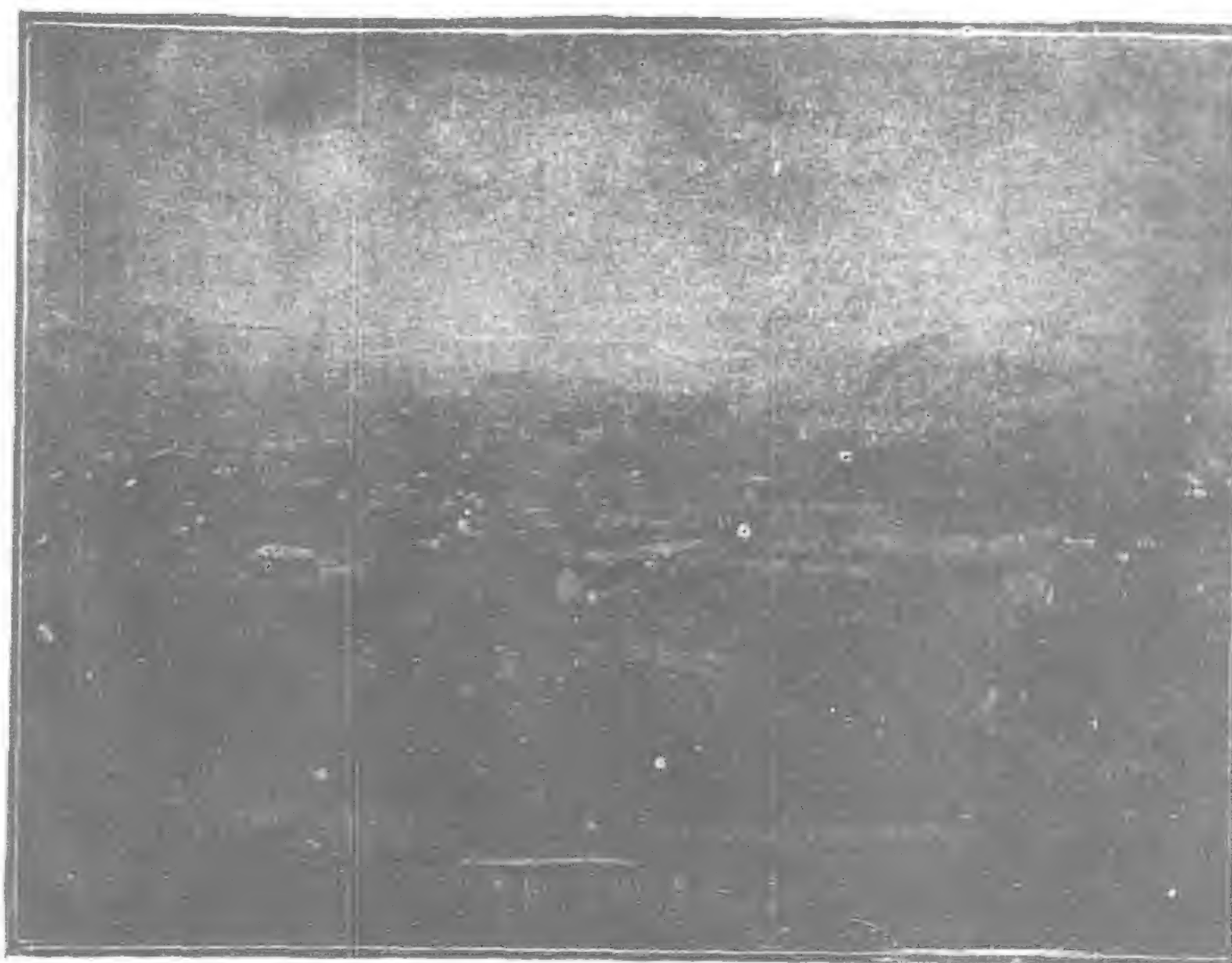
desired, with full particulars as to size, weight, finish, packing, etc. Special catalog on application.

中華民國政府吉長鐵路行車時刻表

CHINESE GOVERNMENT RAILWAYS KIRIN-CHANGCHUN LINE.

TIME TABLE.

DOWN TRAINS		STATIONS	UP TRAINS	
DAILY			DAILY	
MIXED	MAIL		MAIL	MIXED
P.M. 2.30	A.M. 8.30 d.	TOUTAOKJU	P.M. a. 6.00	A.M. 11.10
2.40 2.48	8.40 a. 8.42 d.	2.79 CHANGCHUN	d. 5.50 a. 5.43	11.00 10.56
3.22 3.27	9.12 a. 9.14 d.	12.69 KALUN	d. 5.15 a. 5.13	10.22 10.19
4.00 4.03	9.44 a. 9.45 d.	11.13 YINMAHO	d. 4.43 a. 4.42	9.46 9.40
4.18 4.28	9.58 a. 10.00 d.	5.38 HSIACHIUTAI	d. 4.29 a. 4.27	9.25 9.20
4.41 4.45	10.12 a. 10.13 d.	4.58 YINGCHENG TZE	d. 4.14 a. 4.13	9.07 9.05
5.10 5.19	10.35 a. 10.43 d.	9.14 TUMENLING	d. 3.53 a. 3.43	8.42 8.37
5.38	a. 11.02 d.	2.57 CHAOCHIATIE	d. 3.30 a.	8.17
6.02 6.06	11.22 a. 11.24 d.	9.26 LUAPICHANG	d. 3.08 a. 3.06	7.51 7.47
6.23 6.24	11.37 a. 11.38 d.	6.46 KUTIENTZE	d. 2.52 a. 2.51	7.30 7.28
6.41 6.44	11.53 a. 11.55 d.	6.83 KUCHAN	d. 2.37 a. 2.35	7.11 7.07
7.05	12.15 a.	8.30 KIRIN	d. 2.15	6.45



BIRD'S EYE VIEW OF KIRIN CITY

NOTICE:—"d"—Departure. "a"—Arrival.
1st June 1917

THE PIENLO RAILWAY

(KAIFENG-FU TO HONANFU)

"THE FIRST SECTION OF THE PROJECTED CENTRAL TRUNKLINE"



THE SUNG TOMBS NEAR KAIFENG-FU ON THE PIENLO RAILWAY.

The line connects with the through service of the Peking-Hankow Railway at Tcheng Tchéou, enabling the traveller to visit Kaifengfu, the provincial capital of Honan, and the old capital of the Empire at Honanfu.



Products

Air Brakes
 Circuit Breakers
 Compensators
 Compressors
 Controllers
 Converters
 Cooking Devices
 Fan Motors
 Generators, Alternating and Direct Current
 Generating Sets
 Heating Devices
 Hoists, Electric
 Instruments
 Lamps, Arc
 Lamps, Incandescent
 Lightning Arresters
 Line Material
 Locomotives, Mine, Railway and Industrial
 Meters
 Motors
 Motor-Generators
 Panel Boards and Cabinets
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 Railway Equipment
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 Rheostats
 Supplies, General
 Switchboards
 Switches
 Transformers
 Turbine Generators
 Watthour Meters
 Wire and Cables
 Wiring Devices



The Master Workman —

The great builder is Electricity. With its aid your engineers daily accomplish new feats of construction and operation. Enormous bridges, great dams, immense ships, docks, dikes and tunnels are carried to swift completion—*Electrically*.

Electricity controls the lock gates of the Panama Canal: Electric locomotives tow the great ships through. The traffic of the East and West crosses the backbone of our continent on electrically hauled trains.

The cloth of your suit was undoubtedly woven by an electric loom, cut by an electrically driven knife, and put together on an electrically driven machine. In an ever widening field this greatest SERVANT of mankind is performing the labors of men's hands and tiring muscles.

In the development and improvement of the ways of applying the forces of Electricity, it has been the distinction of the General Electric Company to play a leading part. Through its great Research Laboratories, engineering organization and extensive manufacturing plants. ALL that has been learned in each field of electrical endeavor has been applied to the furtherance of every other field.

And when you have any problem of light, heat, power or transportation, or when you buy any piece of electrical apparatus—remember the experience and knowledge summed up by the monogram G-E and that it stands for

"The Guarantee of Excellence on Goods Electrical"

7123

General Electric Company

General Office: Schenectady, N. Y.

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Yokohama—General Electric Company, 23 Water Street
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 Tokyo—Mitsui Bussan Kaisha, Ltd., 1, Suruga Cho.
 Shanghai—Andersen, Meyer & Co., Ltd., 5 Yuen Ming Yuen Road
 Manila—Frank L. Strong Machinery Co., 64-68 Calle Echague

Certain-teed



Certain-teed

is tangible—

something you

can take hold of

It means

certainty of quality

and guaranteed

satisfaction

Certain-teed Roofing

For Office buildings, factories, hotels, stores, godowns, garages, etc.

LIGHT IN WEIGHT, WEATHERPROOF, CLEAN, SANITARY, AND FIRE RETARDANT

Made in one, two, and three ply thickness

Andersen, Meyer & Co., Ltd., Shanghai
Agents for China

Pacific Commercial Co., Manila
Agents for the Philippines

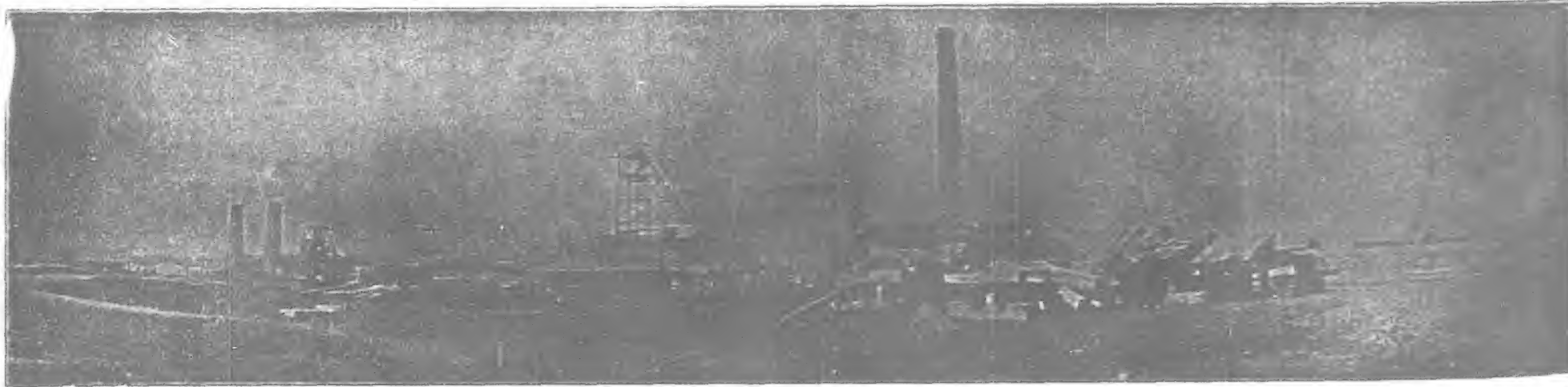
F. W. Horne Company, Tokyo
Agents for Japan

CHINESE GOVERNMENT RAILWAYS

THE TAO-CHING RAILWAY

TAOKOU TO CHINGHUA

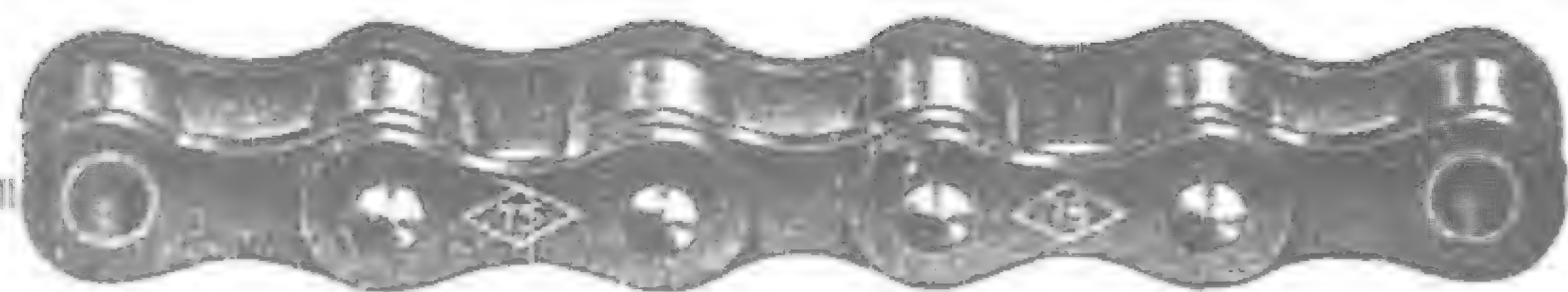
(CHINESE GOVERNMENT HONAN LINE)



GENERAL VIEW OF COAL MINES ON THE LINE OF THE TAO-CHING RAILWAY

“China’s Road of Anthracite”

THE TRAINS OF THIS LINE CONNECT AT SIN-SIANG-SIEN WITH THE THROUGH SERVICE OF THE PEKING-HANKOW RAILWAY. IT TAPS THE GREAT ANTHRACITE COAL DEPOSITS OF SHANSI, AND CONVEYS THE PRODUCTS OF THE MINES TO THE NEAREST NAVIGABLE RIVER.



'DIAMOND' CHAINS

for

Cycles, Motorcycles, Automobiles,
Motor Trucks and Power Transmission

PRODUCED in the largest factory in the United States devoted exclusively to the manufacture of high-grade steel block and roller chains. For twenty-five years 'Diamond' Chains have been recognized as the American Standard.

We are prepared to serve the trade promptly with high-grade chains, which are strong, durable and accurately manufactured.

Special care given to Export Shipments.

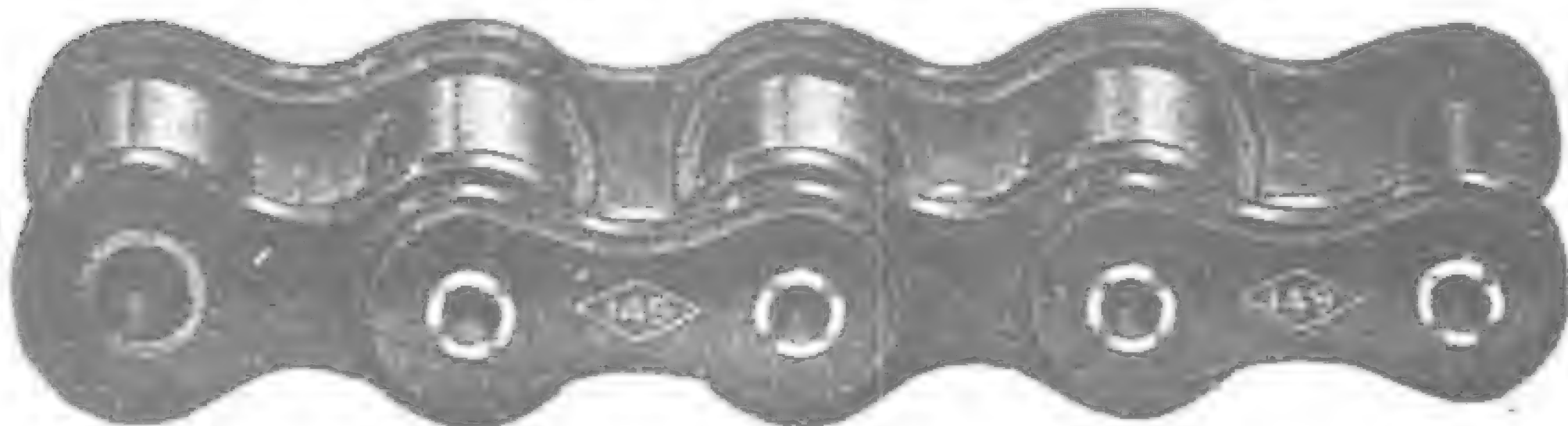
Correspondence solicited in any language.

Catalogue, samples and prices on application.

Diamond Chain & Mfg. Company
Indianapolis, Indiana
U. S. A.

Cable Code — A. B. C. 4th & 5th Editions

Cable Address — "Chain" Indianapolis



For Pumping from Deep Driven Wells

GOULDS POWER WORK- ING HEADS and CYLINDERS

THOUSANDS of Goulds Power Working Heads are installed in various parts of the world, pumping from deep wells for Municipal waterworks, private water supply for factories, hotels, country estates, etc.

The Goulds line contains various types and sizes with capacity up to 16,000 gallons per hour suitable for pumping to total heads up to 500 feet.

These Working Heads are furnished with tight and loose pulleys for belt drive or for direct connection to electric motor.

Some of the smaller types are furnished when desired with an air attachment to enable the working head to furnish both air and water for pressure tank water systems.

The next time you have occasion to pump from deep wells be sure to use Goulds Deep Well Working Heads.

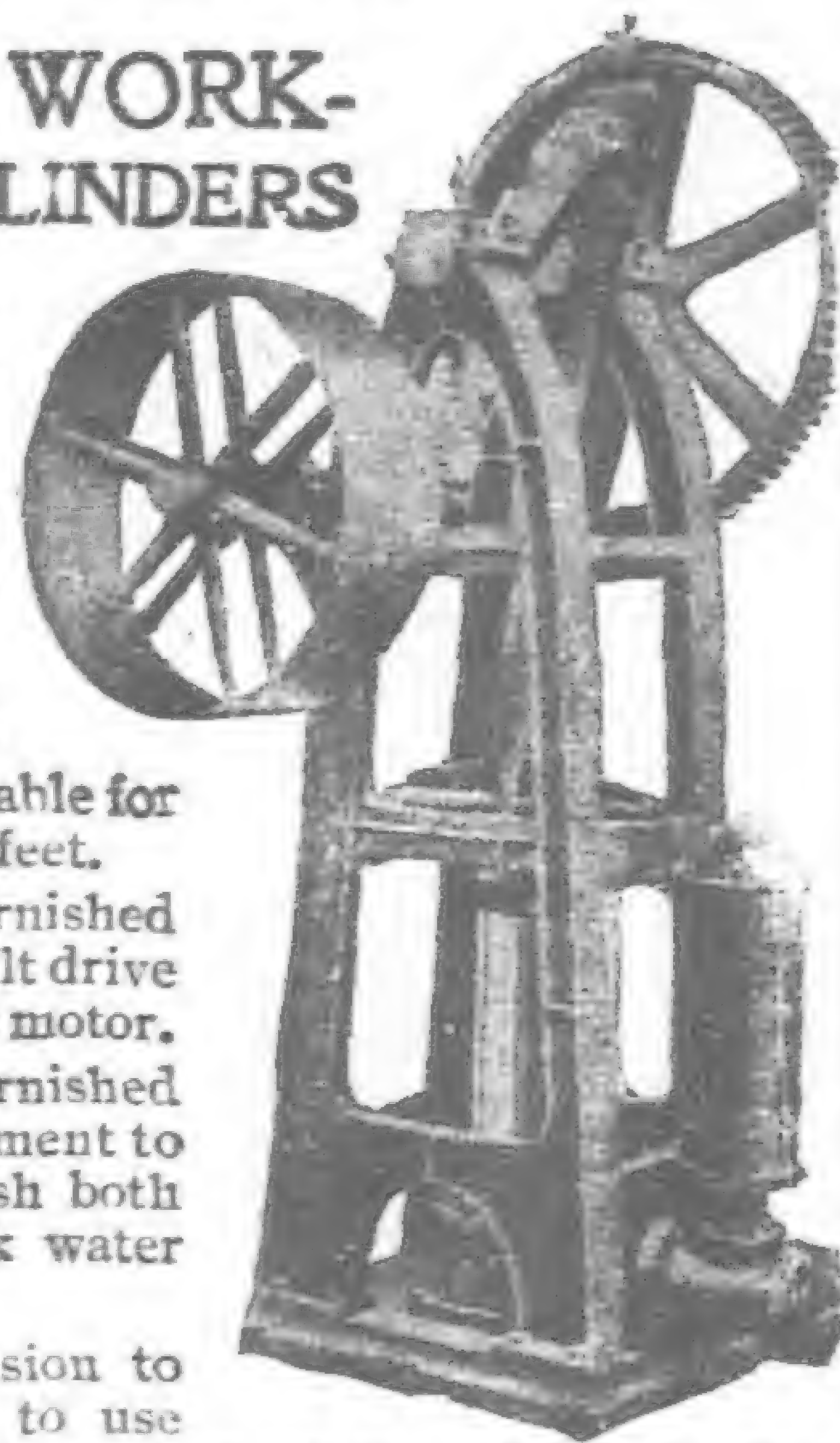
Bulletin 108 describes our complete line. Copy on request.

THE GOULDS MFG. CO.

Main Office and Works Seneca Falls, New York, U.S.A.

CABLE ADDRESS: "Goulds Seneca Falls"—CODES: A.B.C., Liebers, Western Union

Agents for Power Pumps:—Anderson, Meyer & Co., Shanghai—Bagnall & Hillier, Gomei Kaisha, Yokohama—Pacific Commercial Company, Manila



Goulds Fig. 971-B Power Working Head. For heads up to 500 ft. and capacities up to 266.6 gals. per minute.

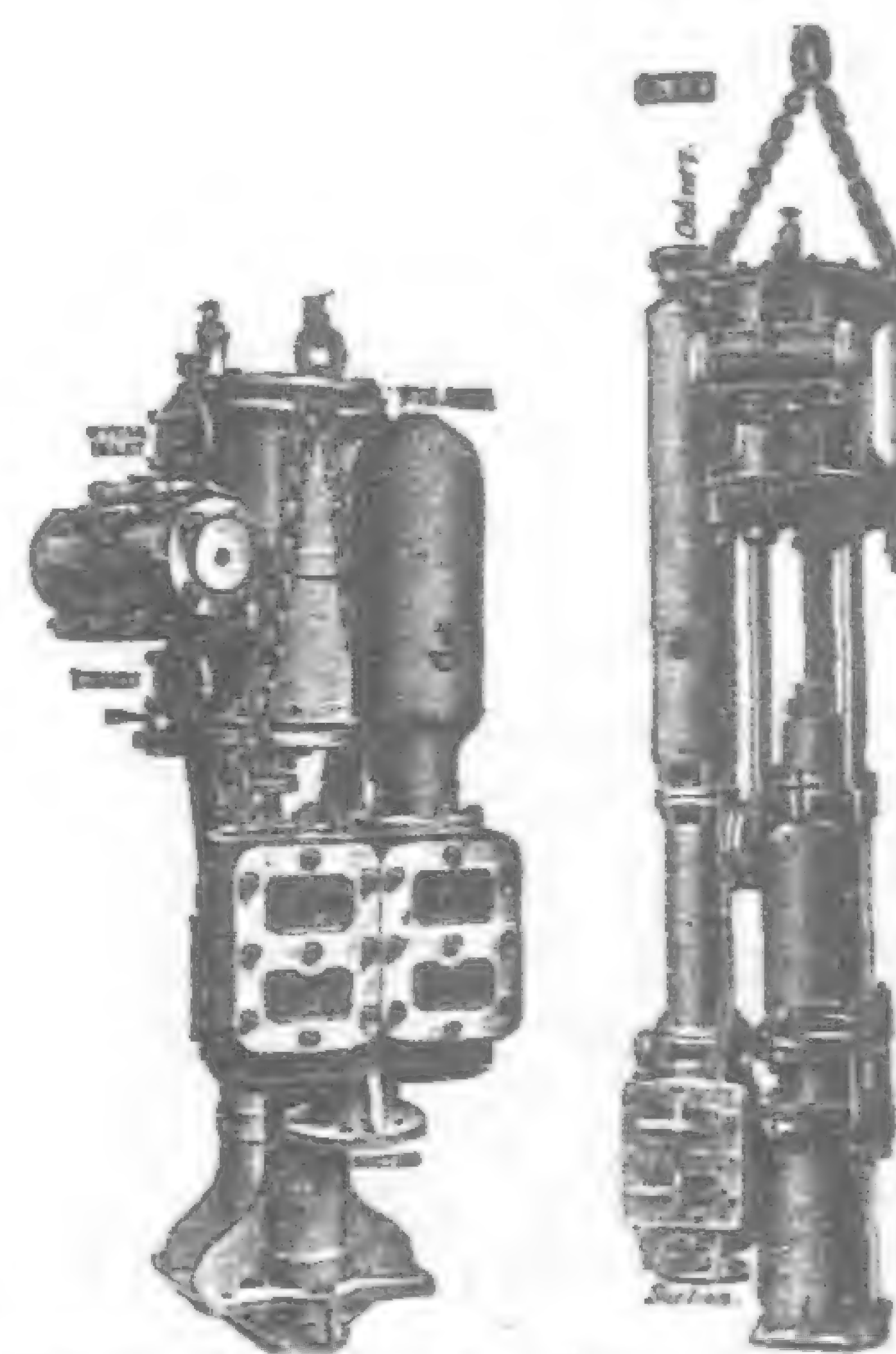
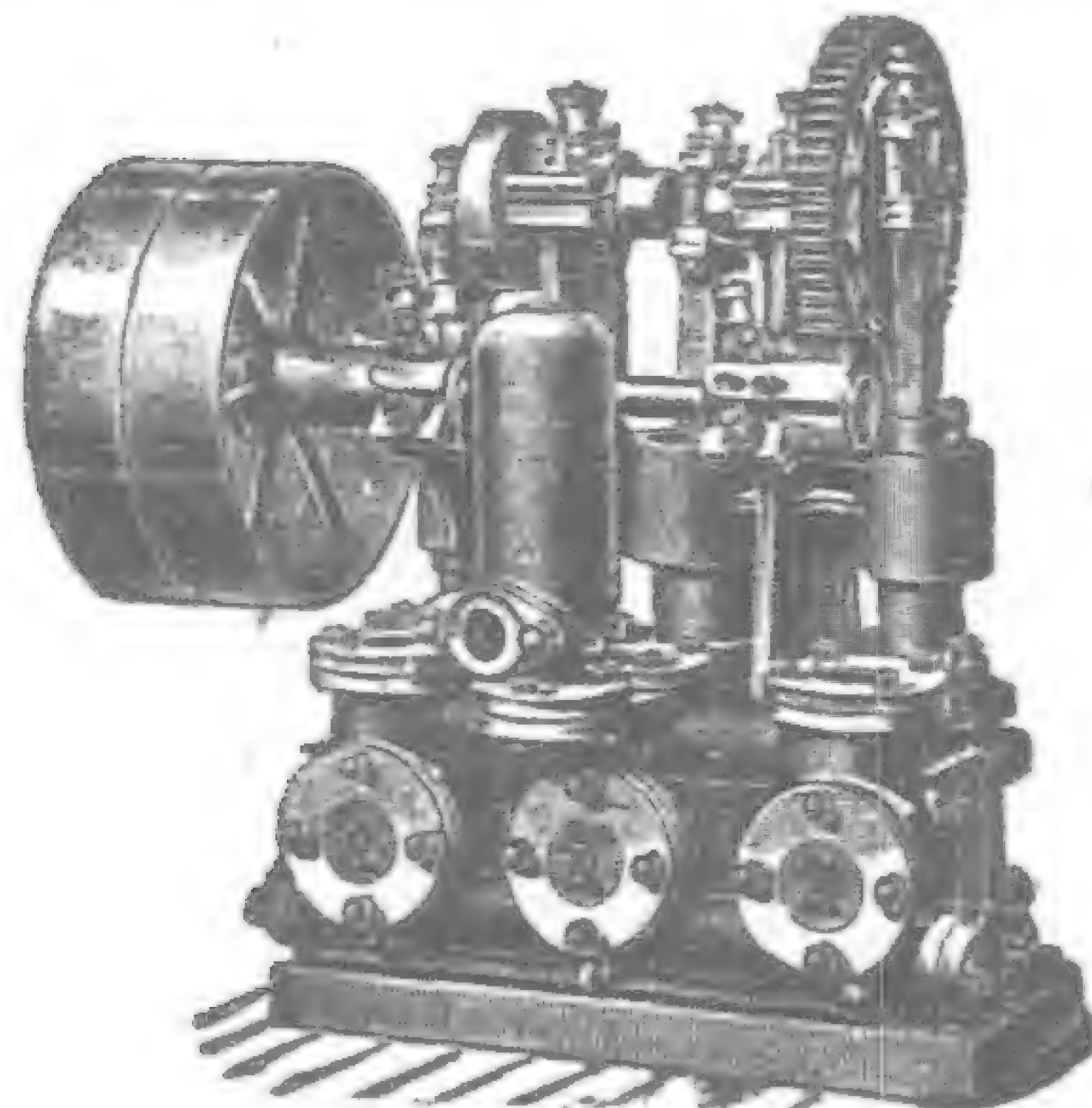
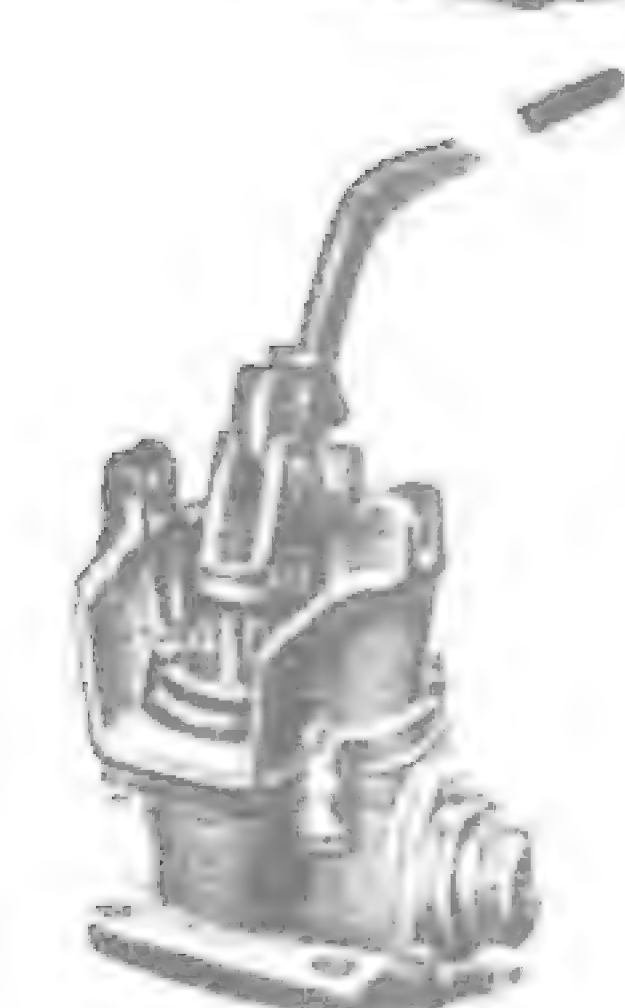
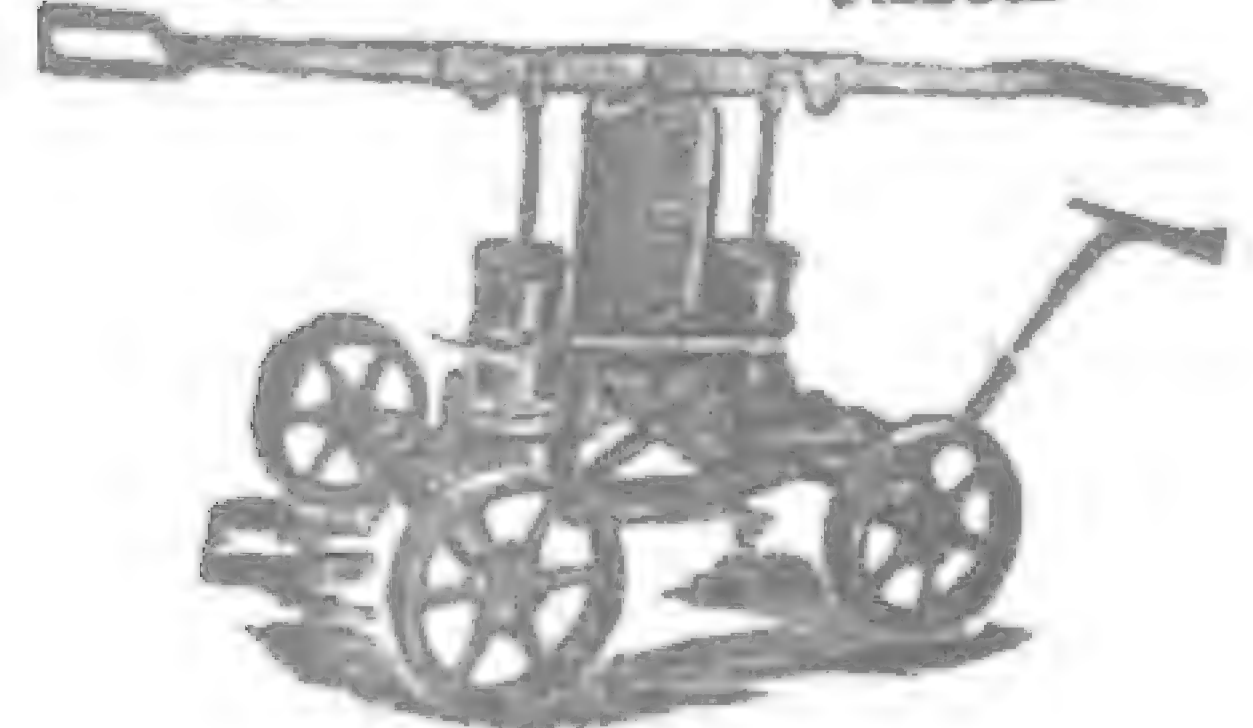
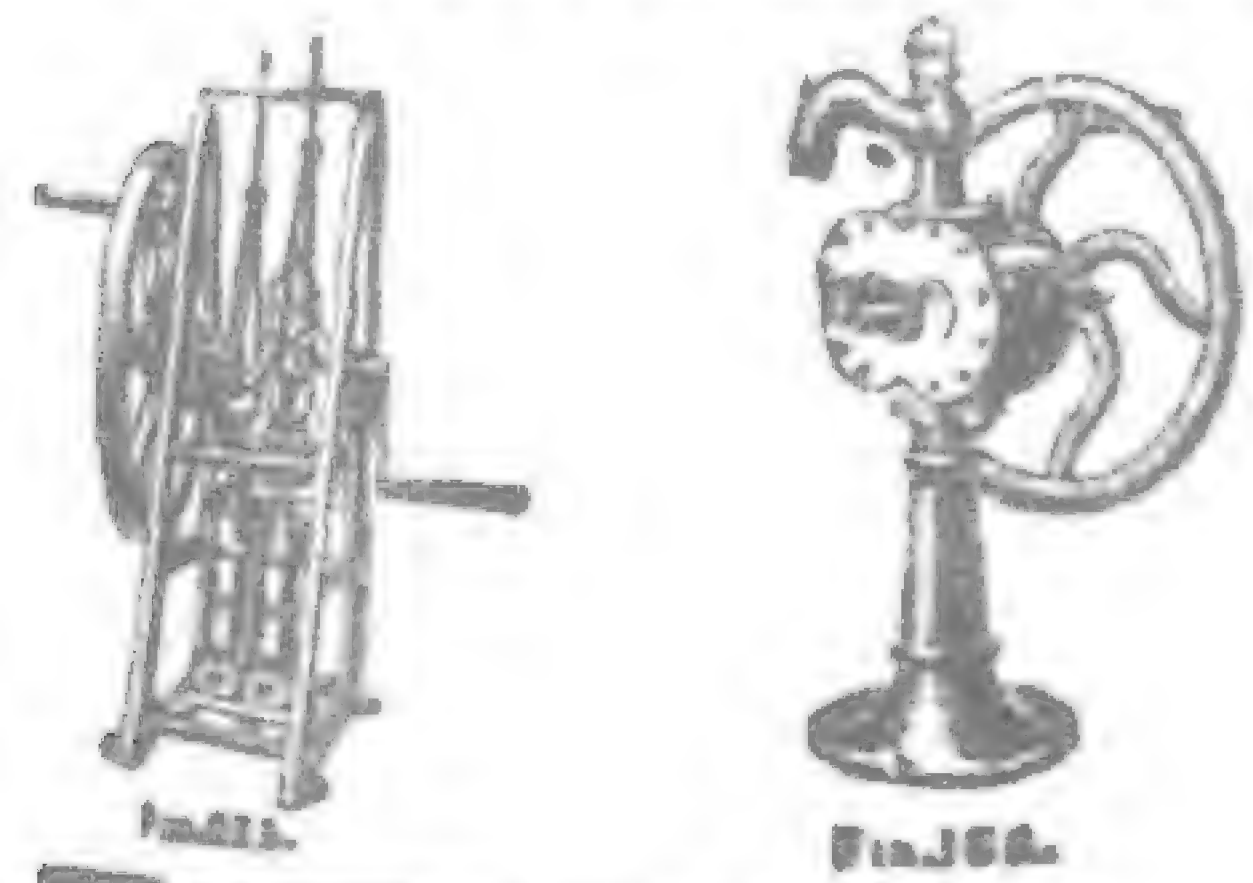
WE MANUFACTURE PUMPS

FOR EVERY PURPOSE

To be worked by HAND, STEAM, BELT, WIND,
WATER or ELECTRIC POWER.



STEAM PUMP for General Purposes.



SINKING PUMPS for COLLIERIES, MINES, Etc.



Fig. 101.

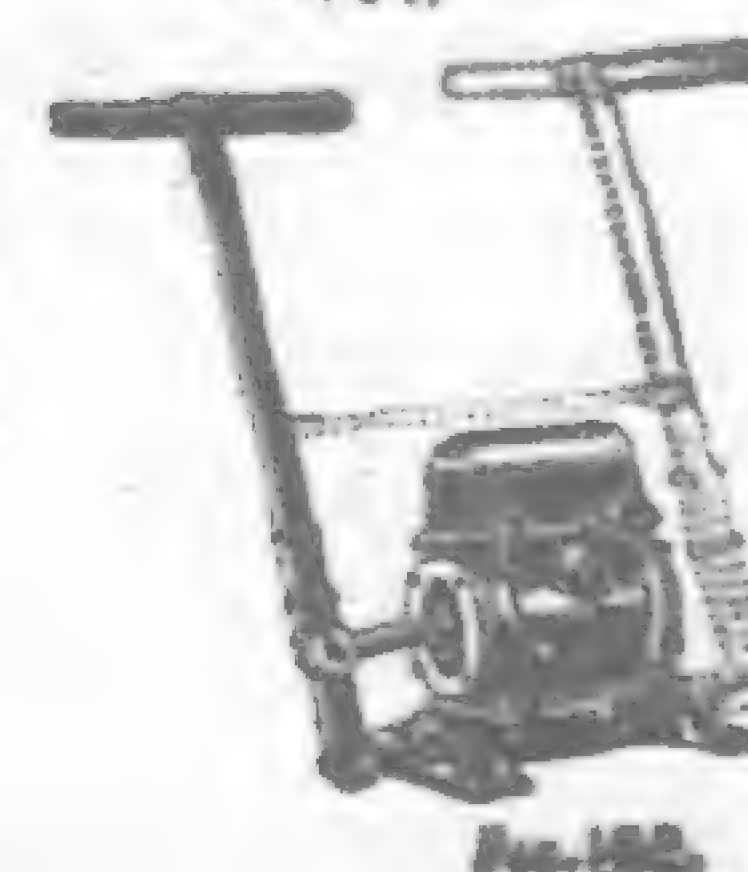


Fig. 102.

Write for "Eastern" List.

JOSEPH EVANS & SONS

(WOLVERHAMPTON) LTD.

CULWELL WORKS,

WOLVERHAMPTON, ENGLAND.



*Starting, Stopping, and Speed Regulation is all controlled
by a touch of the toe.*

Do Your Sewing the Tireless Way

with a

Western Electric

Sewing Machine

ANY electric light socket in your home will furnish the power needed to run the machine an hour or all day long.

THE *Western Electric* Sewing Machine has an electric motor mounted permanently on the Machine head. No adjustments are necessary.

THE Machine in Carrying Cover is no heavier than a well filled suitcase. It is compact enough to be put away on a shelf or under a couch. The motor operates on either direct or alternating current.

Ring Your Bell the Economical Way

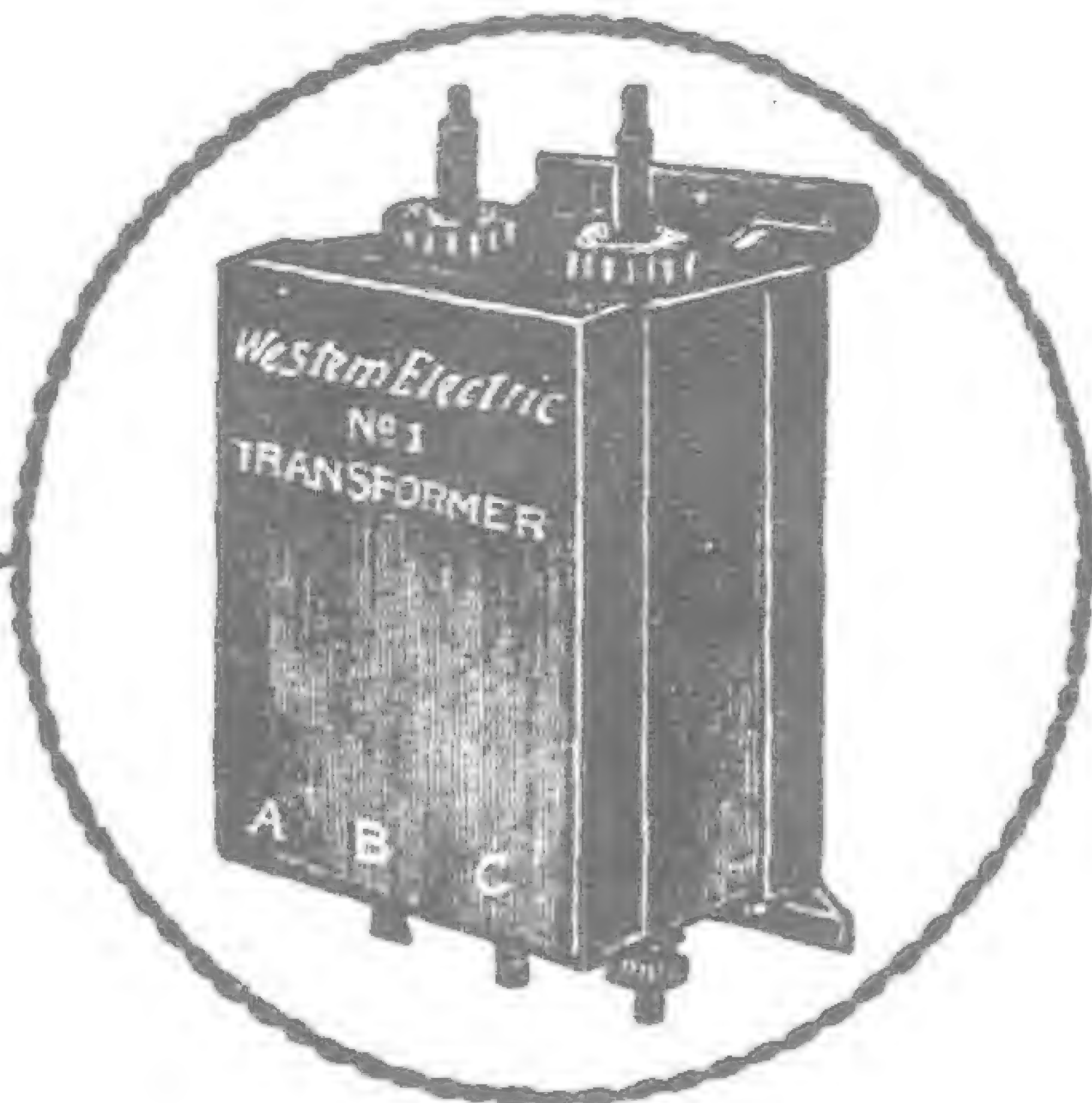
through a

Western Electric

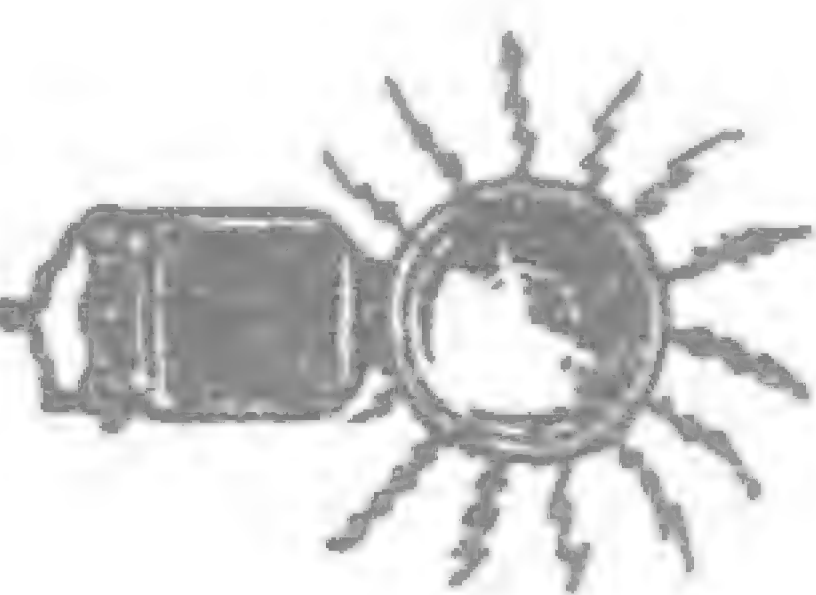
Bell Ringing Transformer



THIS is a compact, attractive and inexpensive little device that is used in place of day batteries to operate Bells, Buzzers, and Door-Openers. The amount of current used is so small it will never be noticed.



It is connected to the lighting circuit and reduces the voltage so that your bell will ring every time you



press it. There are no moving parts to oil or wear out and nothing to be renewed. It requires no attention and will last indefinitely.

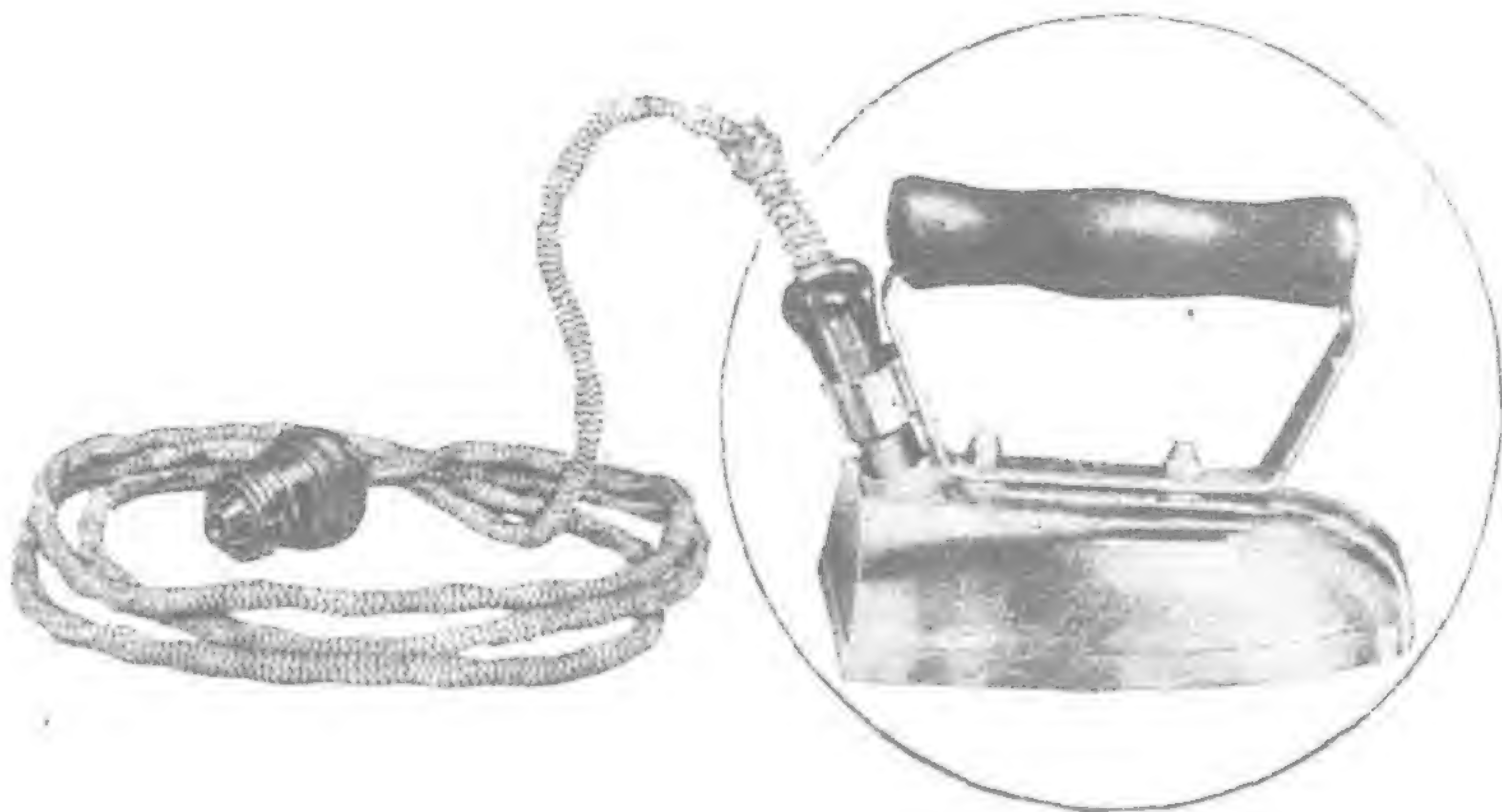
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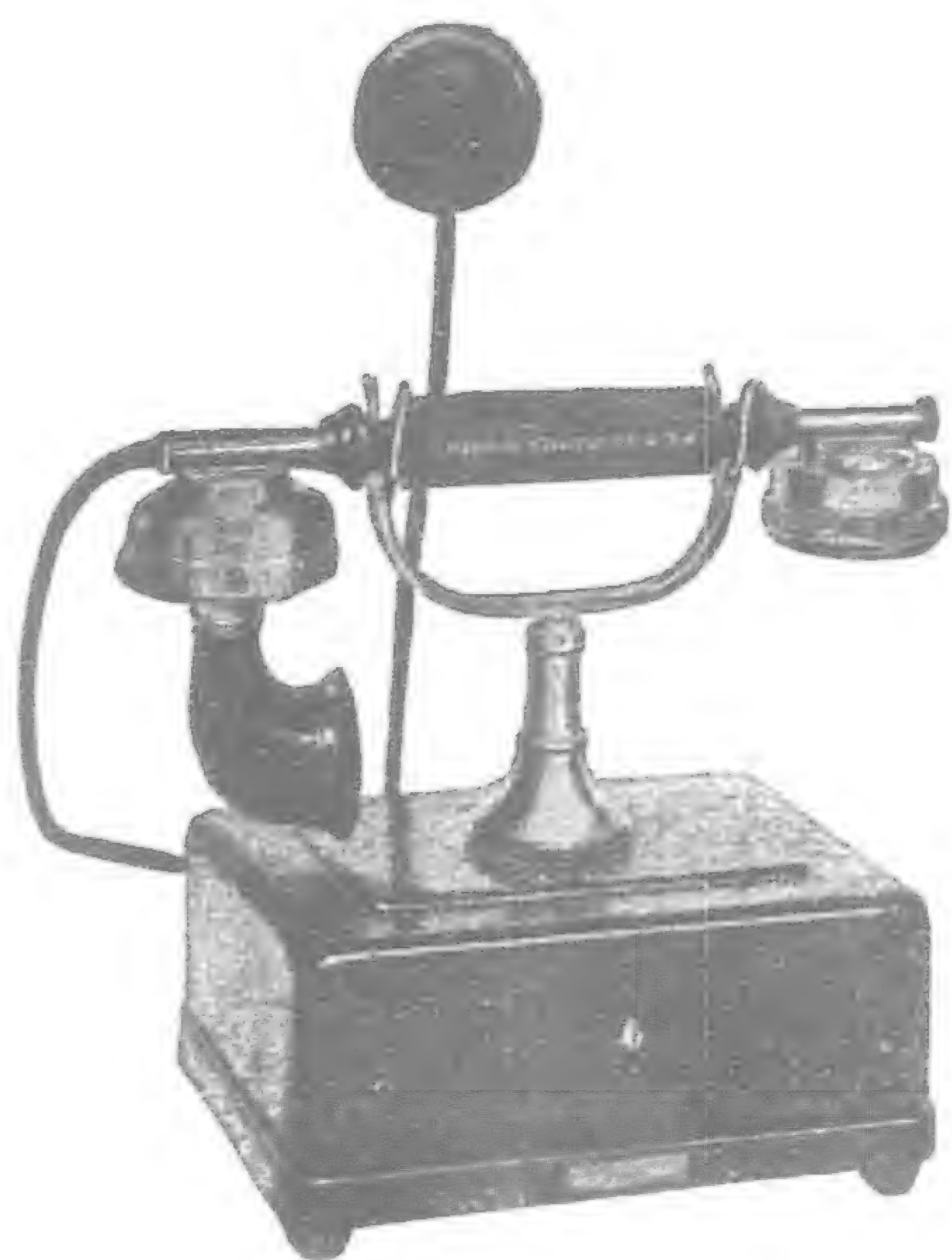
with a

Western Electric Iron

TO iron in the old-fashioned way means a hot stove and a hot kitchen. A *Western Electric* Iron does away with all this. In the *Western Electric* Iron, electric Wires concealed within the Iron itself generate heat within the Iron. Nothing but the Iron gets hot.

You can iron anywhere in any room. All you need is a lamp socket and a *Western Electric* Iron.





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For 38 years the
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Company has supplied the
markets of the world over
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and vast quantities of cable
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the largest switchboards ever
constructed.



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The following common battery telephone exchanges
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thus standardizing and simplifying operation and making
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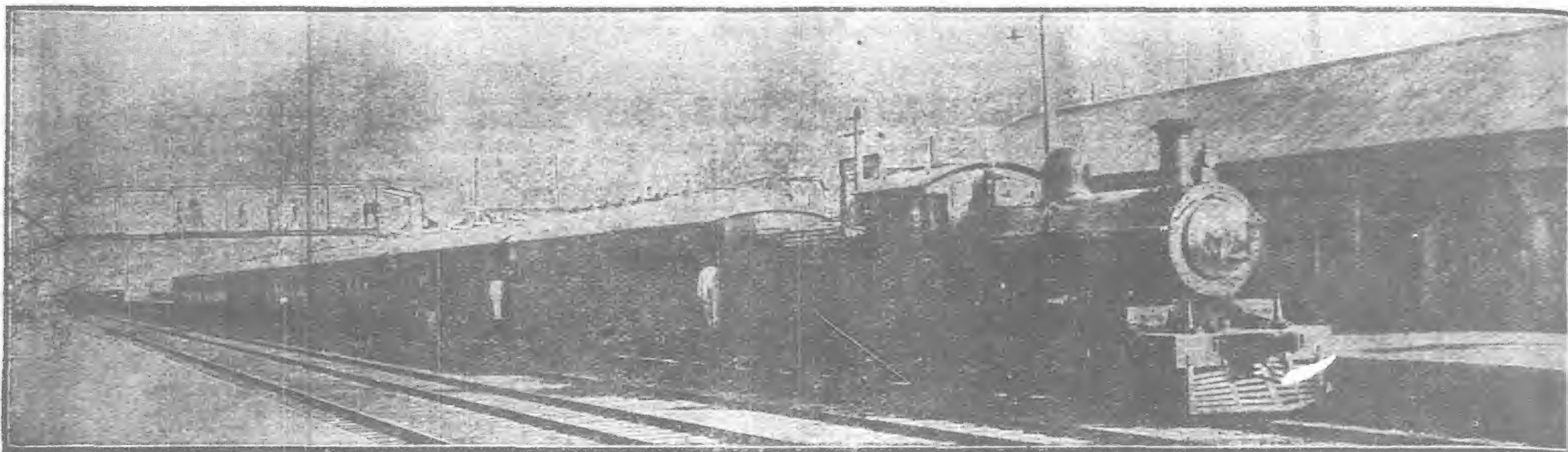
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TOKYO

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Branch Office for China

WESTERN ELECTRIC CO., INC.
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Chinese Government Railways



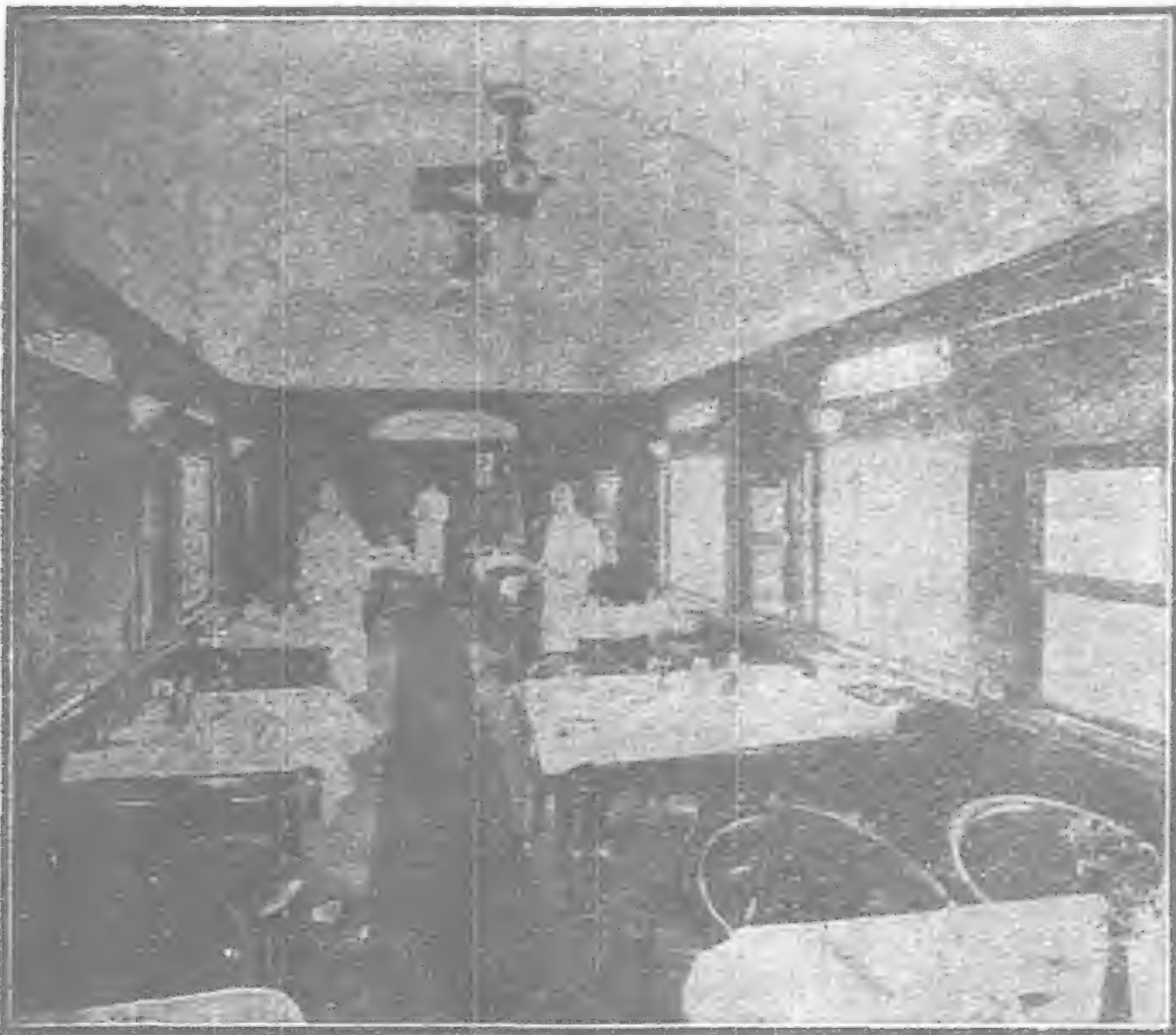
TRAIN DE LUXE AT TIENTSIN EAST STATION

The Peking-Mukden Line

Through service from Peking to Mukden, connecting at Mukden with the South Manchuria Express from Trans-Siberian Route. At Peking connection is made with the Peking-Hankow Railway for Hankow and Yangtze Ports, and Intermediate Points reached by the Chen-Tai Line to Taiyuanfu, the Tao-Ching Line, and the Peinlo Railway to Kaifengfu and Honanfu. Connection is also made at Peking with the picturesque Kalgan Line, "The road to the Great Wall." At Tientsin (Central) connection is also made with the Tientsin-Pukow line for Tsinanfu and Shanghai.

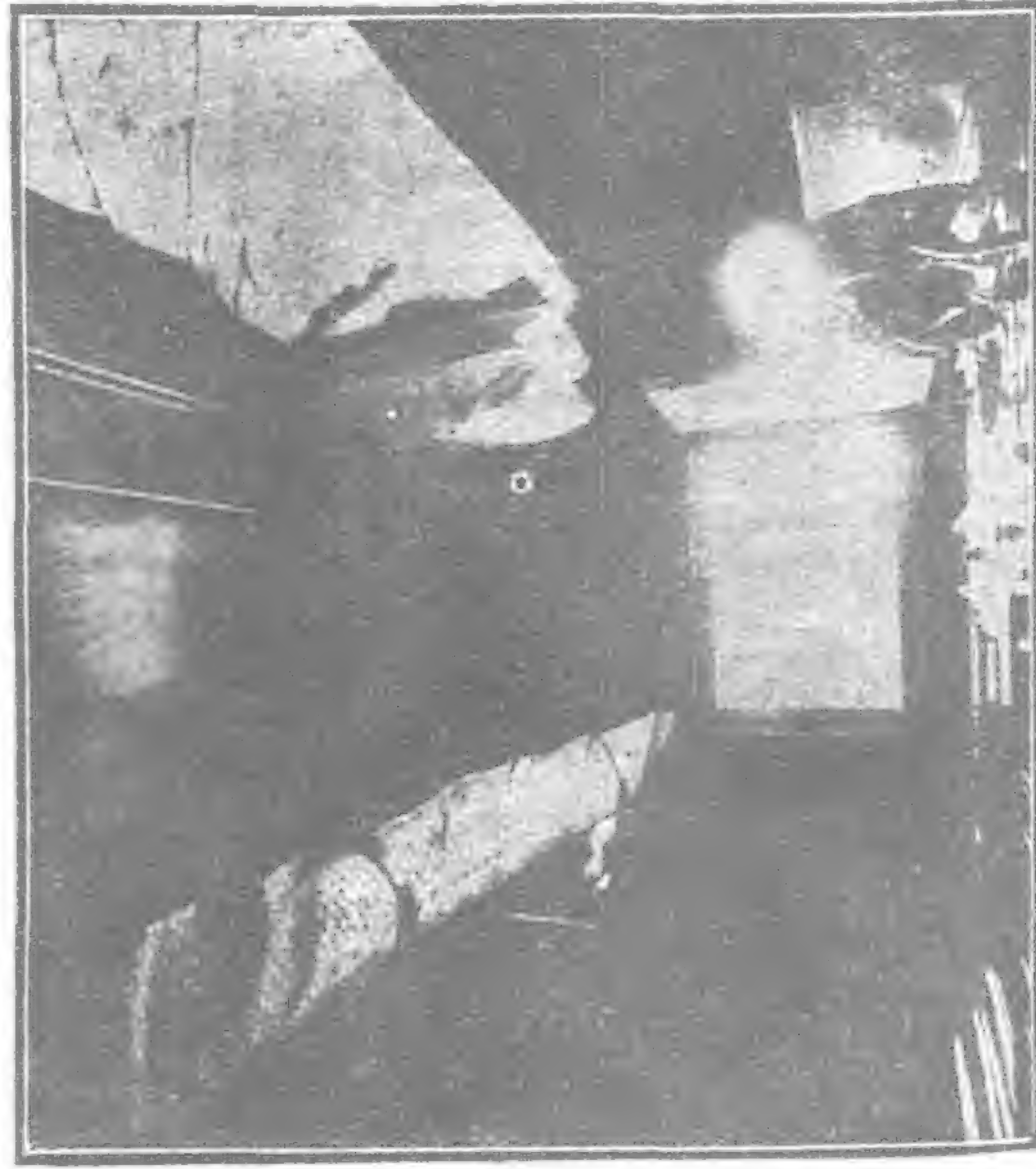
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The through trains are equipped with Buffet and Dining Car Service. A Comfortable, Modern Train De Luxe of Compartment Sleeping Coaches is operated in connection with the through service of the Trans-Siberian and South Manchurian Railways.



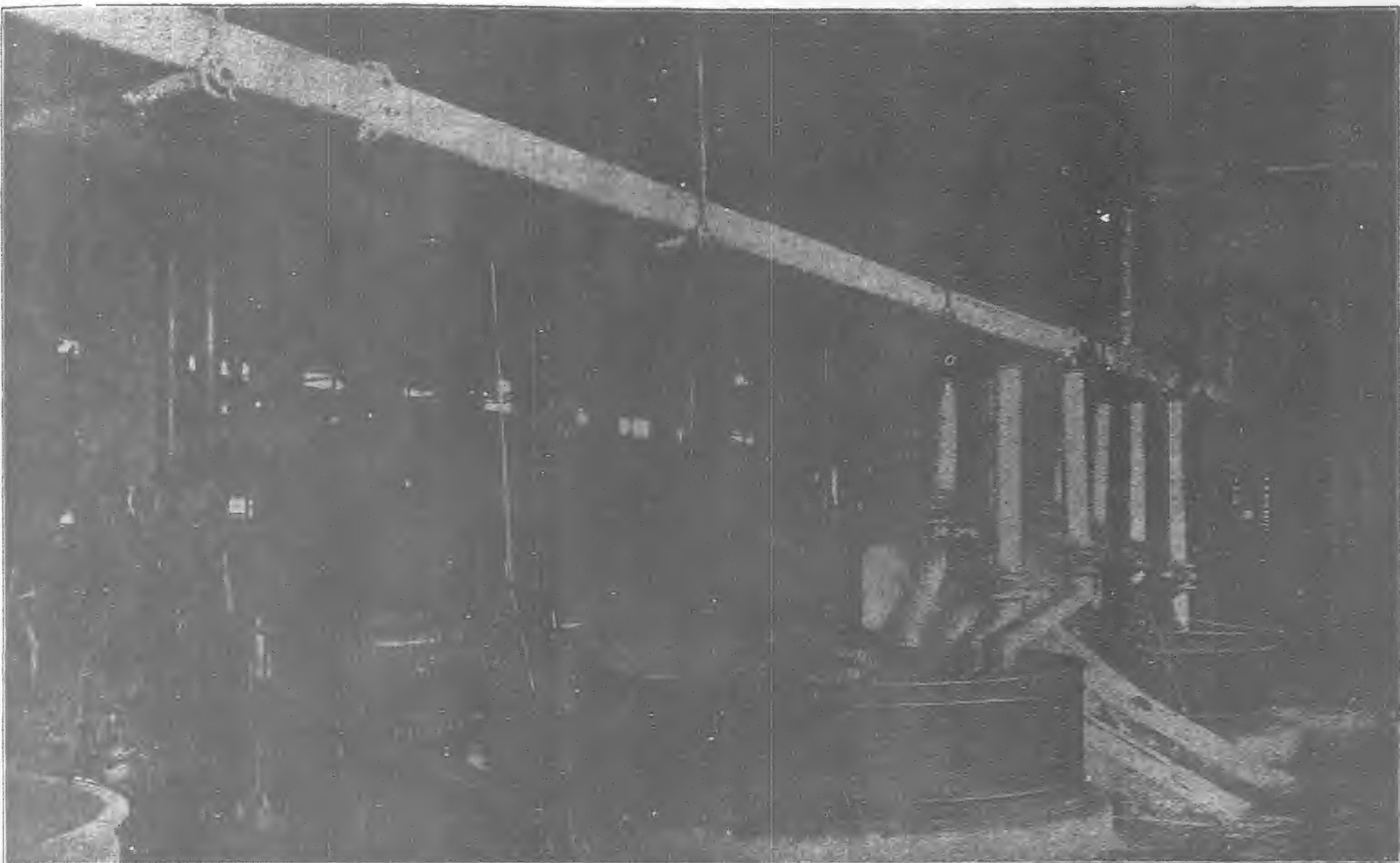
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For information regarding the many places of interest in China, Tourists will find "The Travellers' Handbook for China" with maps most useful. It is obtainable at any of the offices of Thos. Cook & Sons. The Chinese Government Railways Time Table book with Railway map can be had at any of the offices of Thos. Cook & Sons, and the International Sleeping Car Co., Hotels, Clubs and at all important Stations. Full particulars on application to any of the Stations or to the Traffic Manager of any of the Railways mentioned and on application to any office in America, Europe or the Far East of The Cie. International des Wagons-Lits, Thos. Cook & Sons, or

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for highway and railroad drainage, have proven their convenience, reliability and lasting quality in thousands of installations.



Their corrugated form and interlocking joints give them immense strength and a *resiliency* which enables them to conform without injury to settling and shifting foundations.

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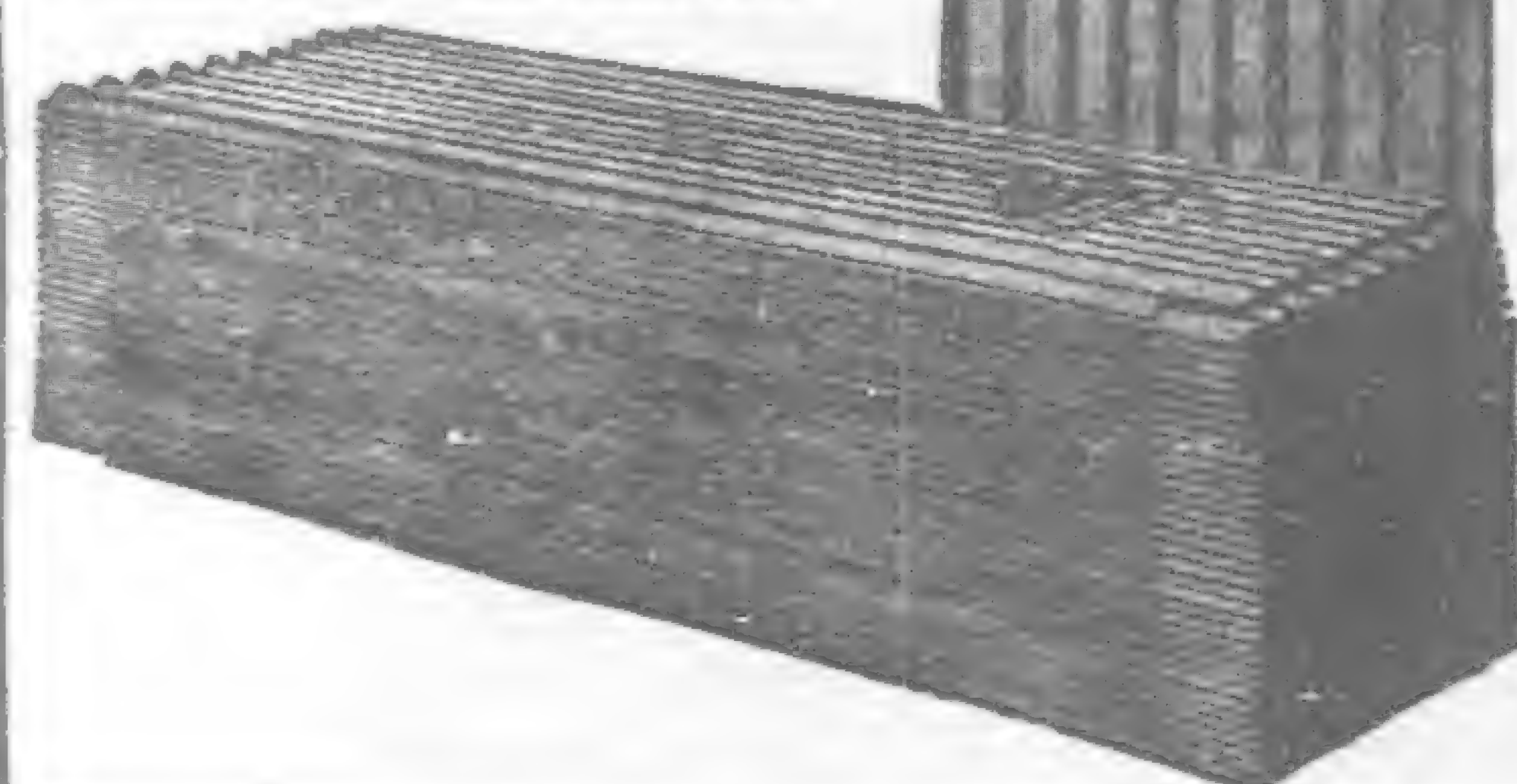
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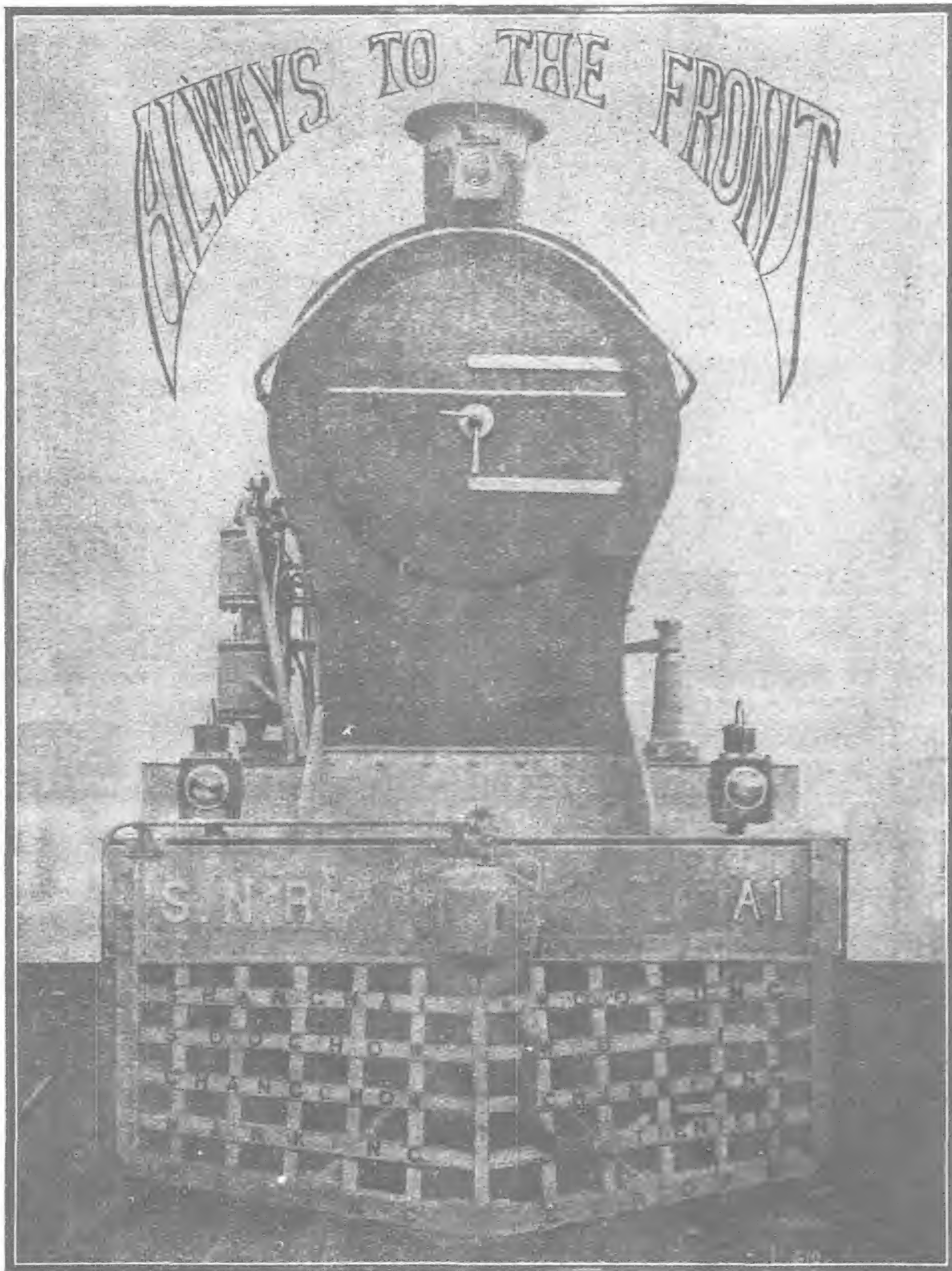
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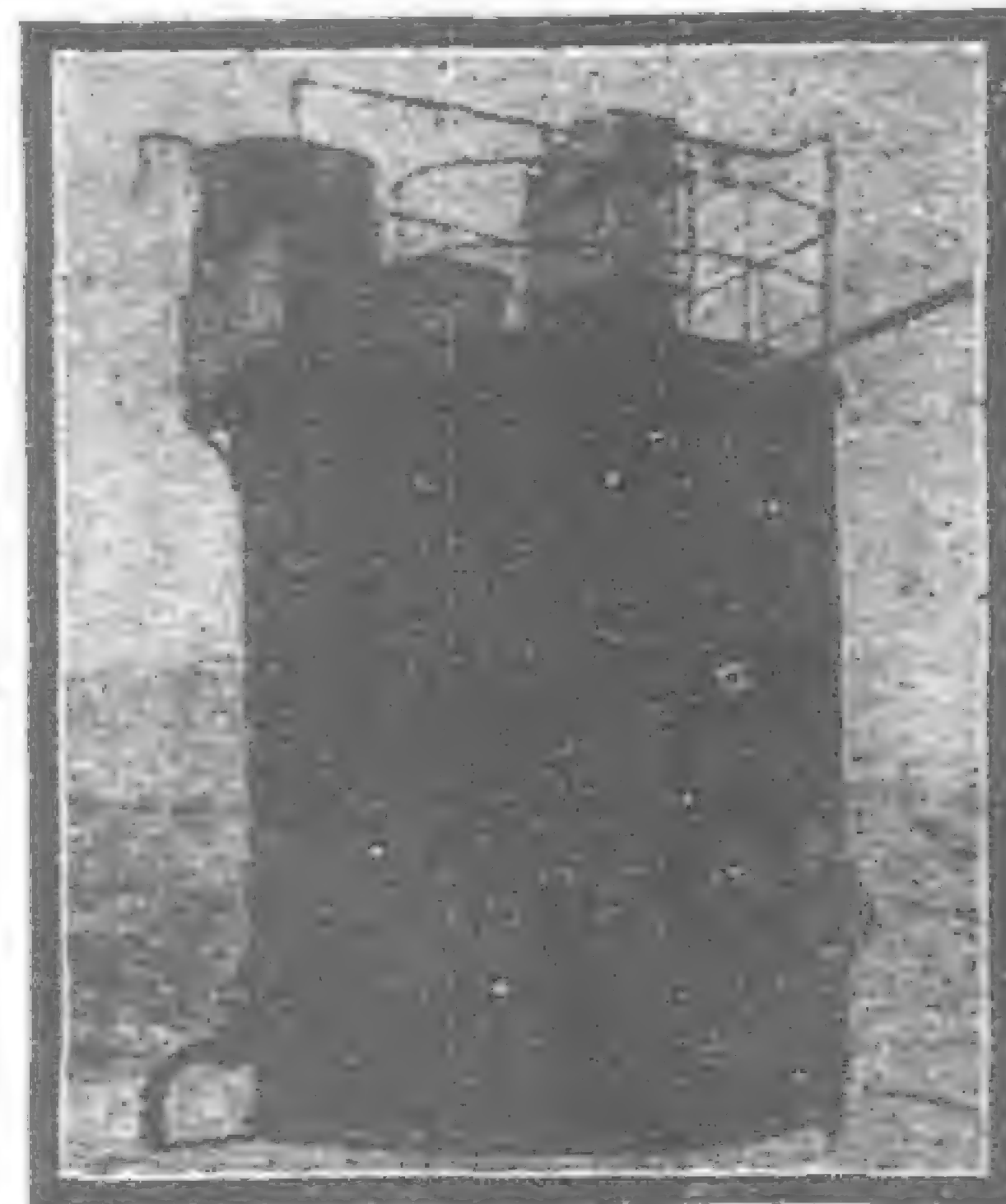
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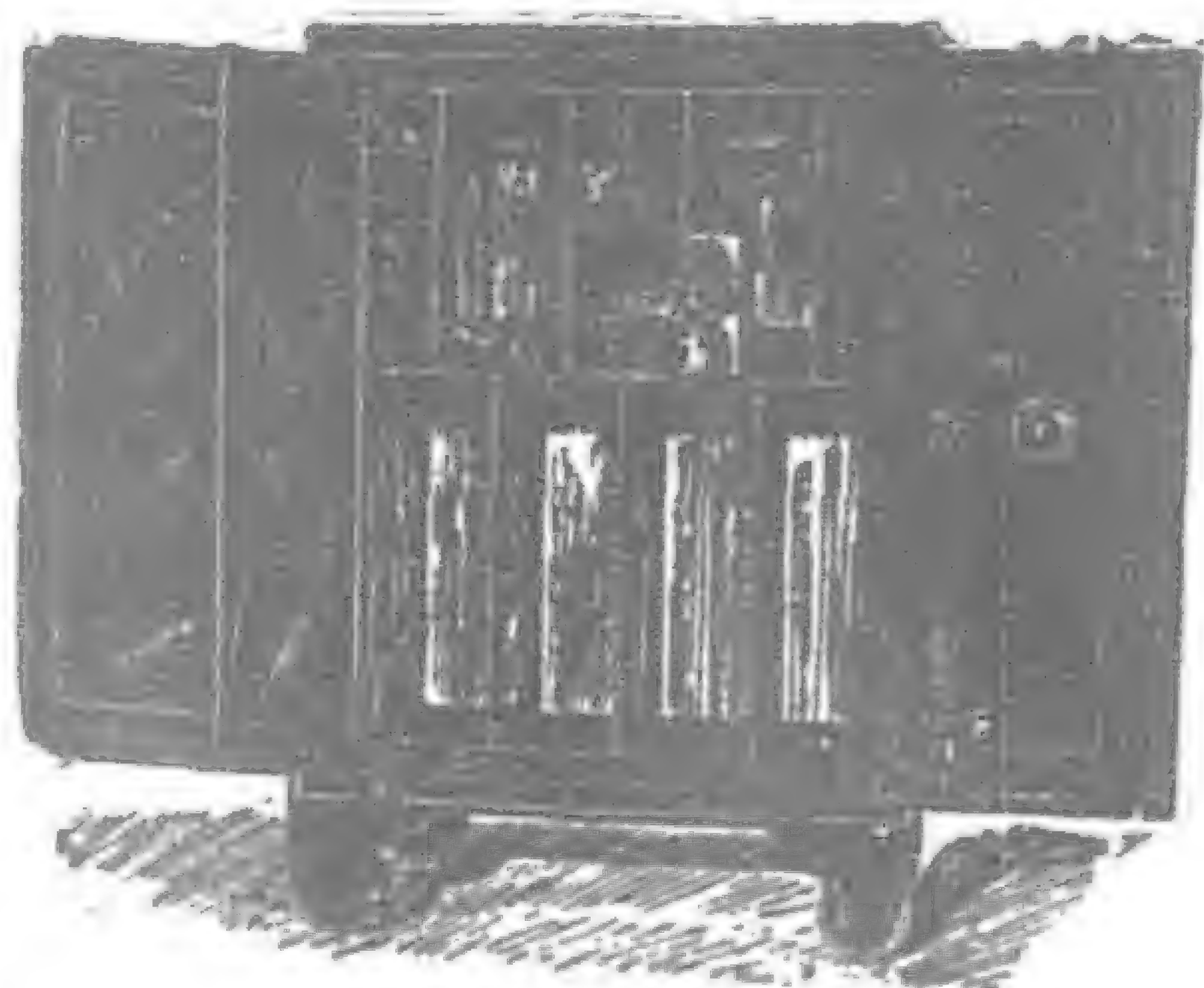
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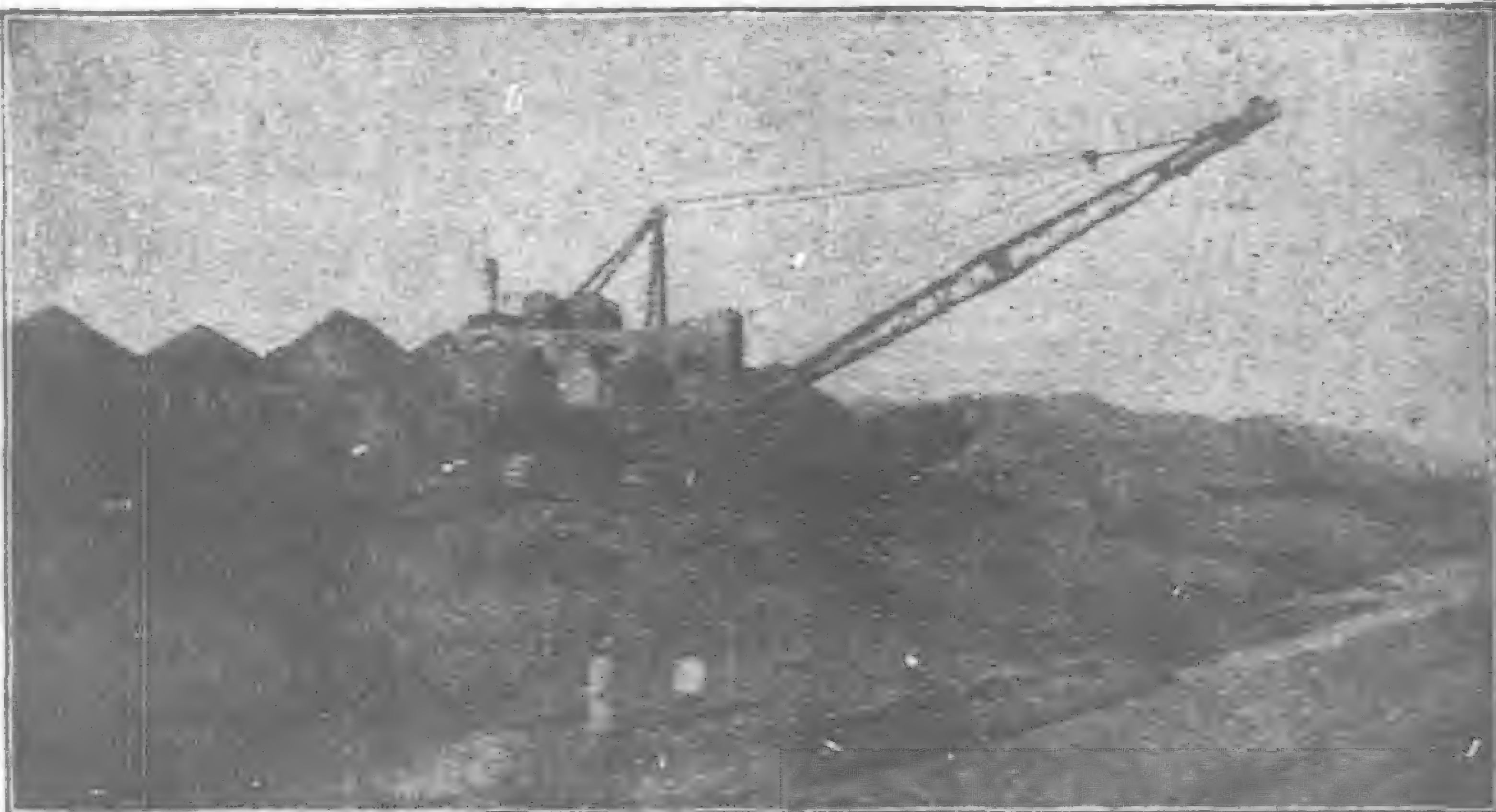
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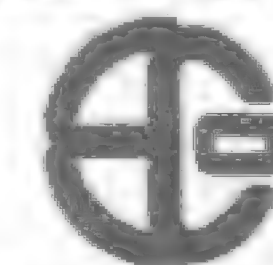


This view shows a Class-14 Bucyrus Dragline Excavator with a 60-ft. boom and 2 cu.yd. bucket enlarging old canals in the Caucasus. Observe it is mounted on caterpillar traction to facilitate moving about. It uses oil for fuel. Russian Government, owners.

BUCYRUS DRAGLINE EXCAVATORS

are in use for digging drainage and irrigation canals, stripping overburden from ore deposits, mining gold, loading gravel and building railways in all parts of the world. Steam, electric and oil operated.

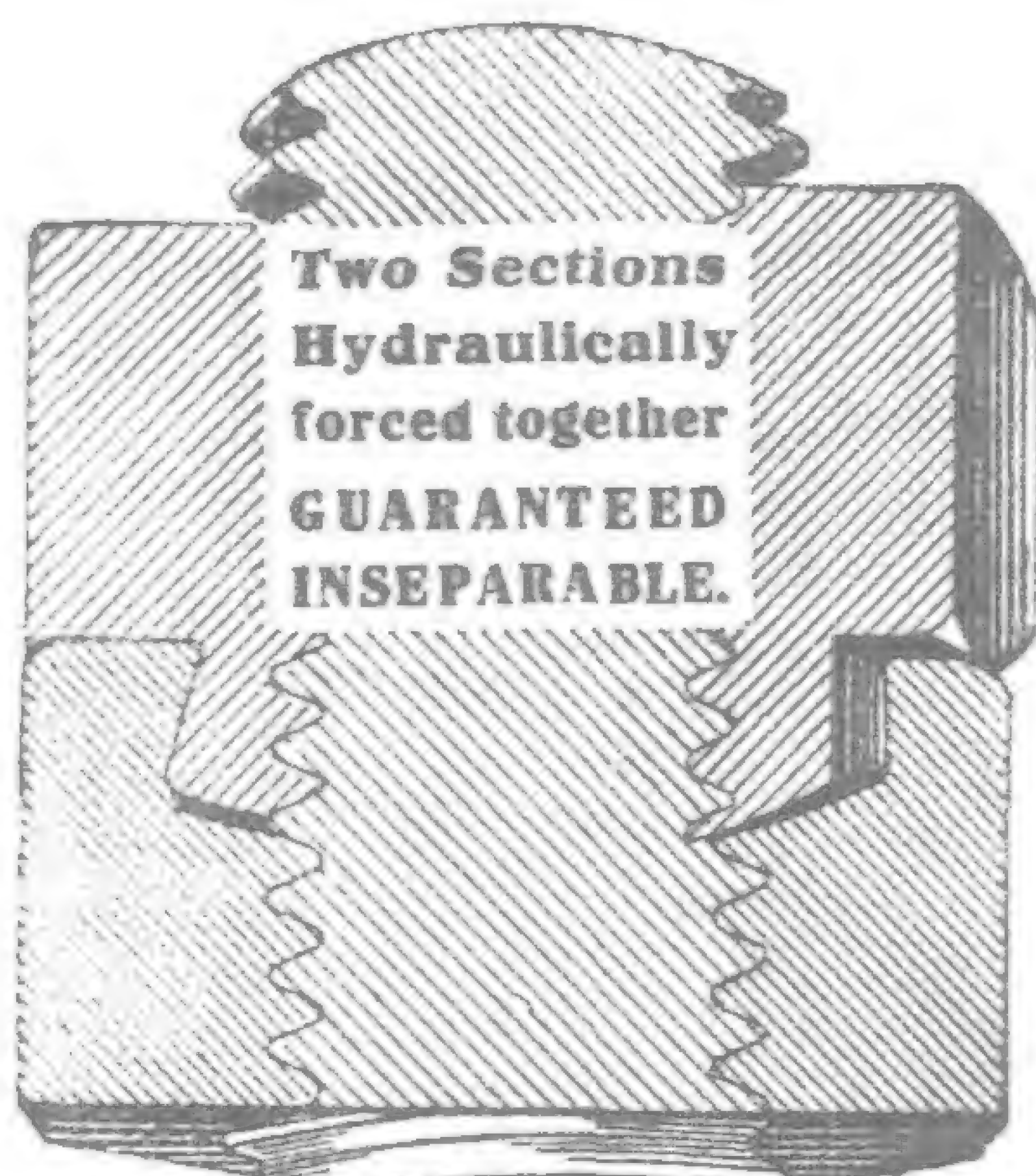
We also build steam and electric shovels, dredges and dragline excavators of all types and sizes.



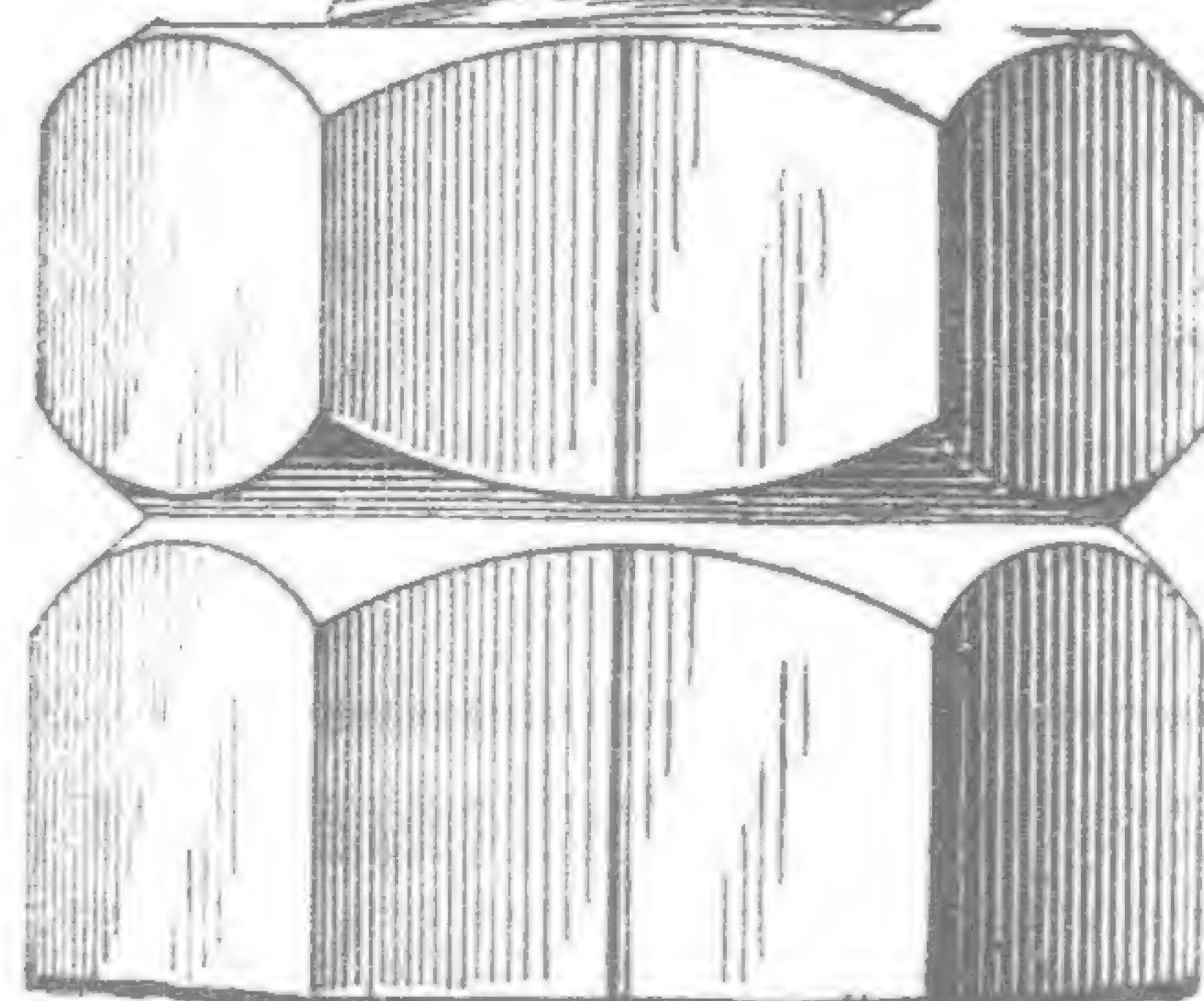
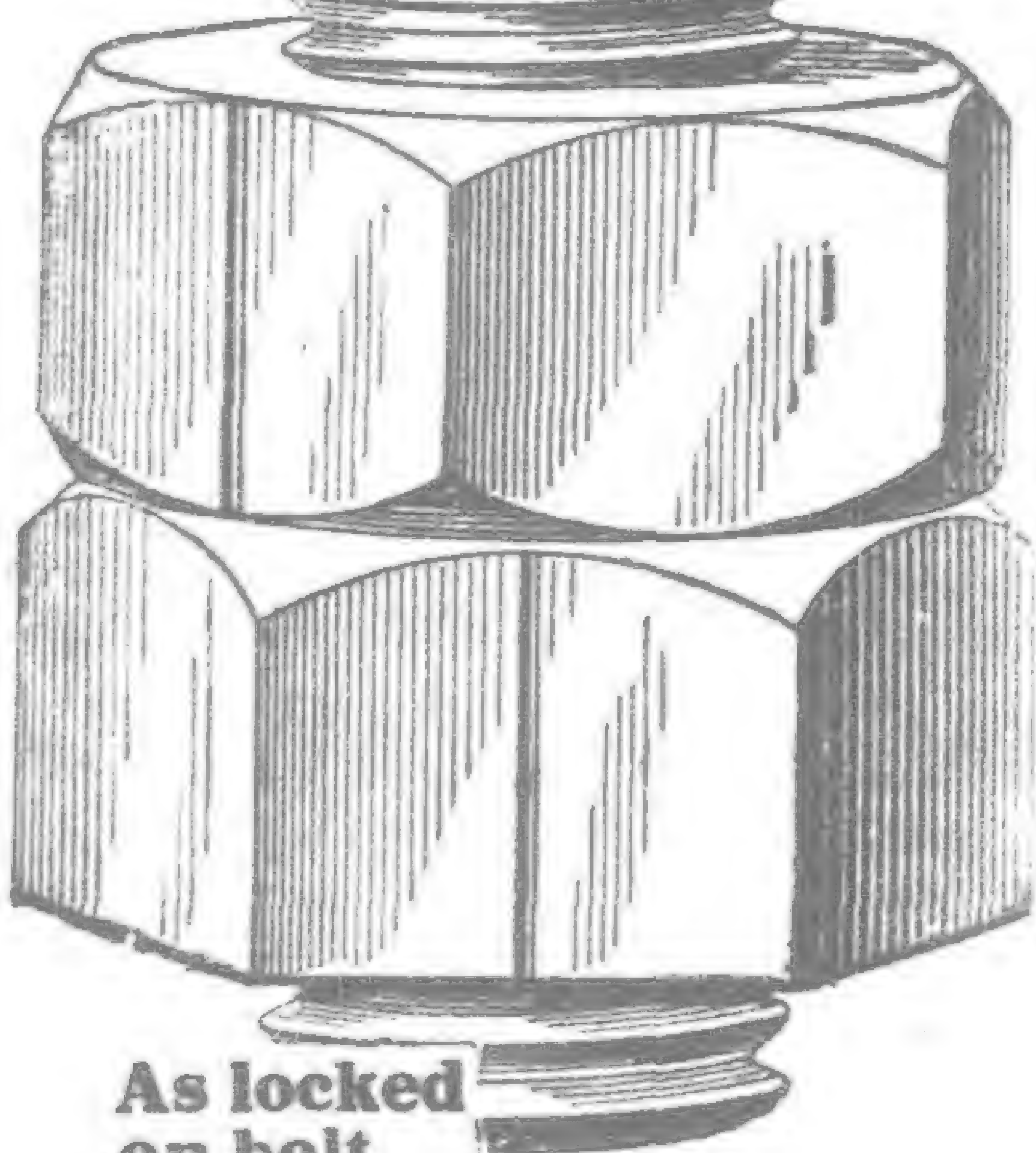
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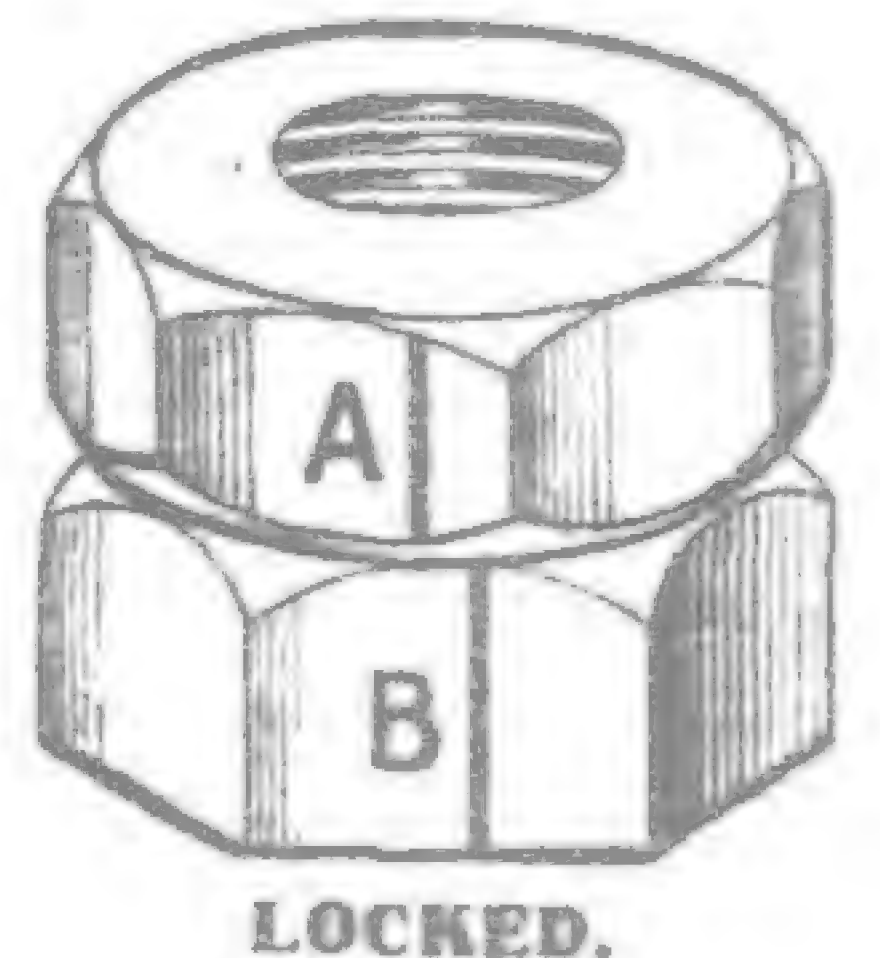
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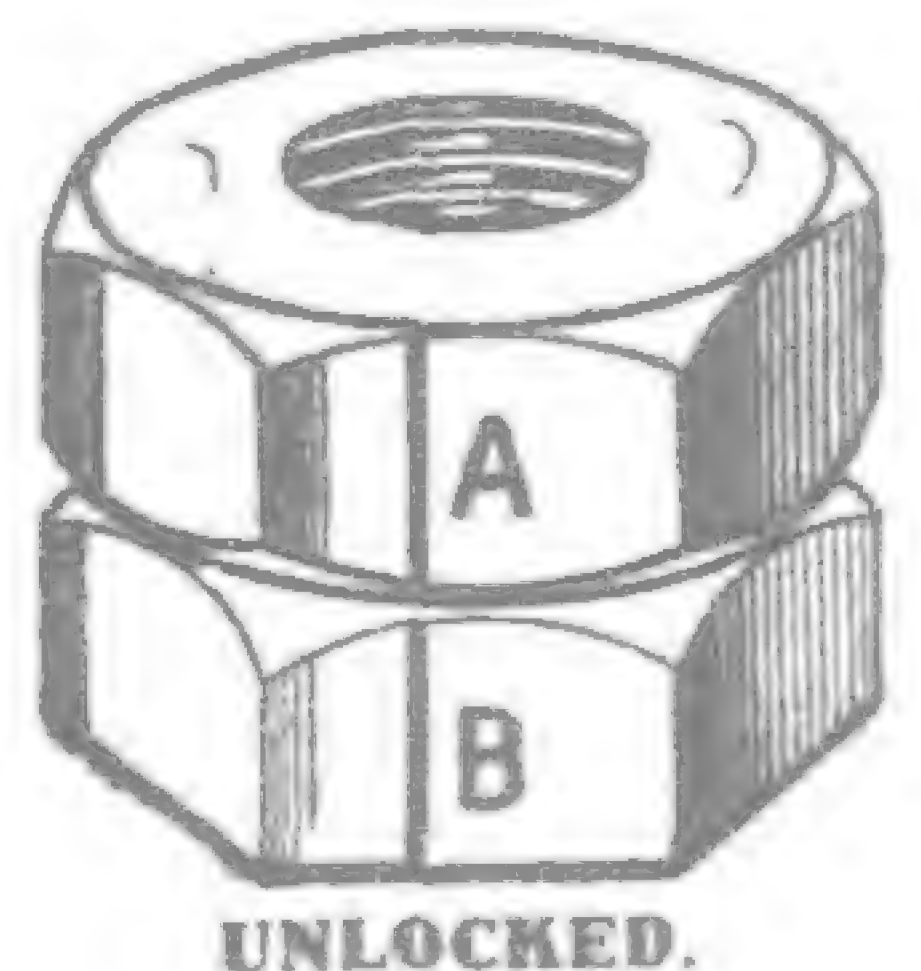


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have proved by continuous tests
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after exceptionally severe tests placed a large order for
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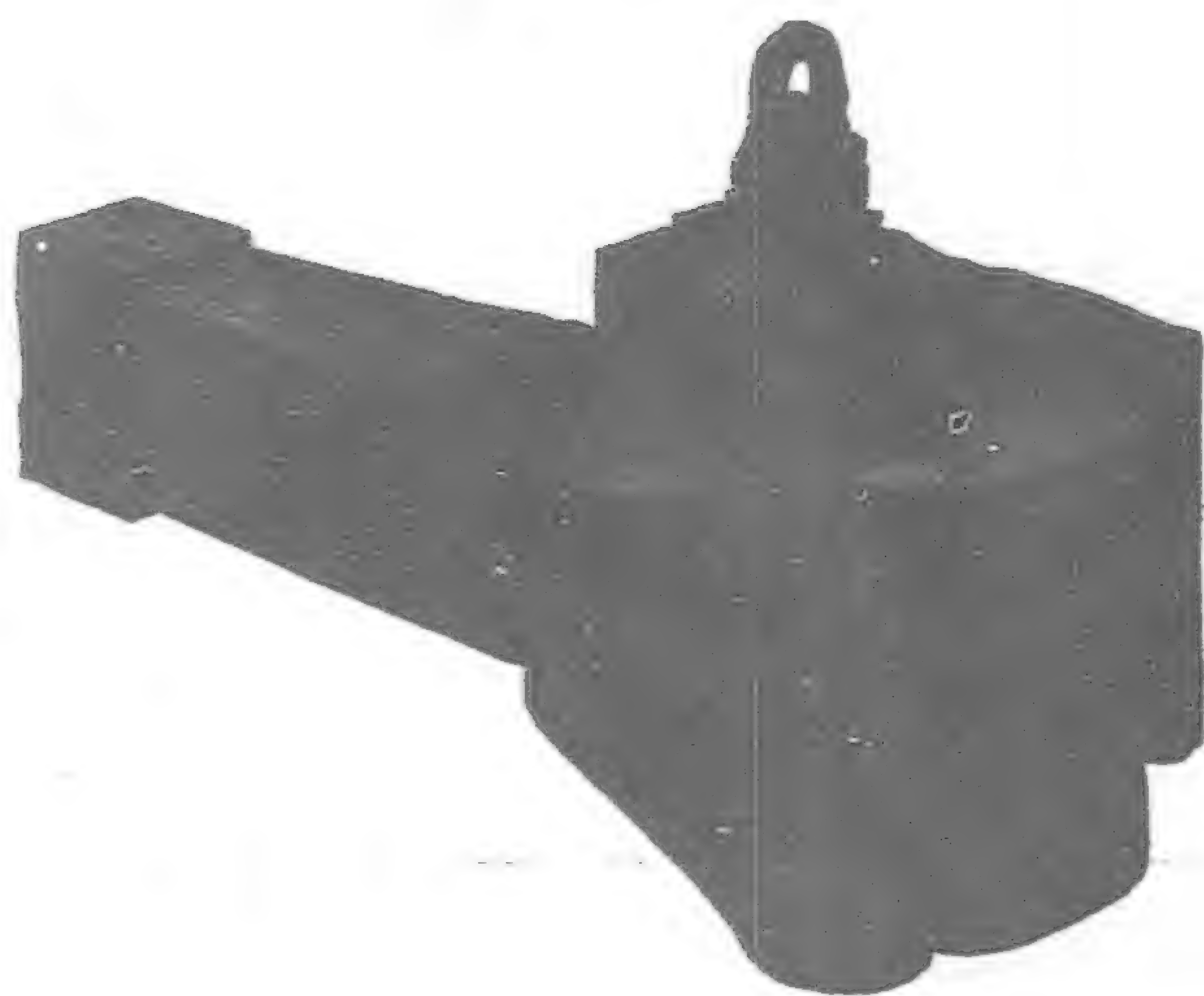
Engineers disappointed by other previous Failures hesitate to spend money to prove claims made by Inventors—and rightly so. The Proprietors of Vislok knowing by experience that Vislok claims are absolutely provable, have from the first adopted the "Confidence Policy" of "Free Sample for Testing" and thereby staking their entire future on practical results from tests made by the Engineer under his own conditions and requirements. Vislok never attempted to solicit for a "Single Order" until Applicant had been given the opportunity of a "free test." All Vislok orders have been given as a result of free tests. Constantly repeated Orders are proving that Vislok is a Reliable Safety Lock Nut that does maintain and uphold under any practical working conditions the wide and definite claims made for it. Vislok's success in "big sizes" from 2 inches and upwards is striking proof of Reliability.

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The JANNEY-PENN Coupler



THE latest development of the Janney type of M. C. B. Coupling originally introduced and promoted by this company. This coupler has all the simplicity of the early type of the Janney coupler, and also has the up-to-date features of a "Lock-to-the-Lock," "Lock-Set," and a "Knuckle-Opener," and complies fully with all the requirements and recommendations of the M. C. B. Association of the U. S. A.

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This coupler has the desirable feature of easy accessibility of parts, thus facilitating the making of repairs.

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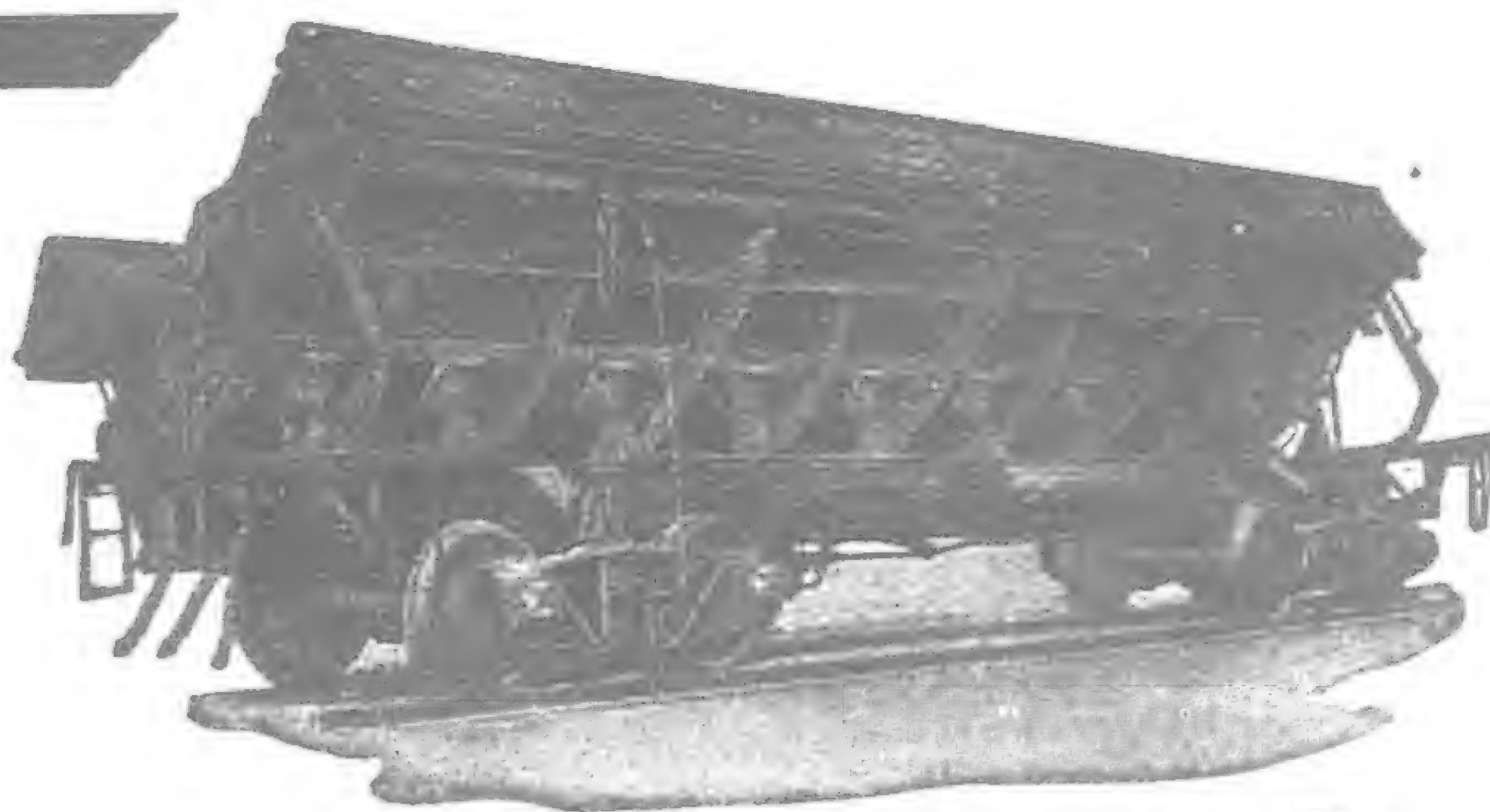
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Allen & Co., Ltd., Edgar.....	64	Diamond Chain & Mfg. Co.	23	Kennicott Water Softener	29	Saco Lowell Shops.....	Cover 3
American Car and Foundry Export Co.	13	Dodge Sales and Engineering Co.	36	Kenyon, George, Ltd.	2	Sale & Frazer.....	2
American Locomotive Sales Corp.	11	Dollar Co., Robert.....	5	Kiangnan Dock & Engineering Works	50	Shanghai Dock & Eng. Co., Ltd., The..	47
American Rolling Mill Co.	27	Drysdale & Co., Ltd.	4			Shanghai Municipal Council.....	4
American Trading Co.	Back Cover					Shanghai-Nanking Ry.	28
American Tool Works Co.	1	Electricity Department S.M.C.	4	Langdale M. & Co.	3	Shewan, Tomes & Co.	44
Andersen & Co. A. O.	51	Escher Wyss & Co.	3	Lidgerwood Manufacturing Co.	38	Siebe, Gorman & Co.	29
Andersen, Meyer & Co.	43	Evans, Joseph, & Sons.....	23			Simmons Manufacturing Co., The	45
Anderson & Co., Wm. H.	48					South Manchuria Railway Co.	17
		Fairbanks Morse & Co.	37	Masséy, Geo. B. Co.	3	Standard Oil Co., of New York.....	61
		Flat San Georgio.....		Matthews and Yates, Ltd.	3		
Babcock & Wilcox, Ltd.	51	Gaston, Williams & Wigmore	8	McConway & Torley Co., The.....	31	Trimont Manufacturing Co.	45
Baldwin Locomotive Works	15	General Electric Co.	21	Micanite & Insulators Co.	59	Thorneycroft & Co., John I., Ltd.	1
Bank of China.....	48	Gilman Frank	5	Mitsubishi Zosen Kaisha, Ltd.....	49	Trussed Concrete Steel Co.	56
Bank of Communications	56	Goulds Manufacturing Co.	23	Morse & Son, (Inc.) A. J.	4		
Bank of the Philippine Islands.....	Cover	Grace & Co. W. R.	61	Mustard & Co.	29	United States Steel Products Co.	18, 19, 40, 58
Birmingham Small Arms Co.	2	Green Island Cement Co., Ltd.	54			United Brass Founders & Eng., Ltd.....	62
British American Tobacco Co.	28	Hasler Telegraph Works.....	49	New York Purchasing Agents.....	57		
Bucyrus Company.....	29	Haywards, Ltd.	4	Niles-Bement-Pond Co.	57	Vislok, Ltd.	80
		Heap & Co., Ltd., Joshua.....	35	Nobel's-Glasgow	59		
Canada Carbide Co., Ltd.	53	Hongkong & Shanghai Banking Corporation	6	North Western Expanded Metal Co.	53	Wah Chang Mining & Smelting Co., Ltd.	7
Canton-Kowloon Ry.	42	Hongkong & Whampoa Dock Co., Ltd.	49			Western Electric Co.	24, 25
Cemented Products Corp.	22	Henry Hope & Sons.....	37			Western Wheeled Scraper.....	32
Chartered Bank	32	Hupp Motor Car Corp.	63	Pacific Mail Steamship Co.		Willis Overland Co.	55
Chicago Bridge & Iron Works.....	46			Pease, The C. F. Co.	4	Wisconsin Electric Co.	9
Chinese American Co.	37	International Banking Corp.	6			White & Co., J. G.	64
Chinese Government Railways	10, 12, 14, 20, 22, 24, 26, 28	Jacks & Co., William.....	Cover	Rendrock Powder Co.....	9	Worthington Pump Co., Ltd.....	5
Chosen Railway.....	16	Jardine, Matheson & Co.....	46	Russo-Asiatic Bank	9		
Commercial Cars.....	52	Jones & Lamson Machinery Company.	33			Yokohama Specie Bank, Ltd.	62
Commercial Press, Ltd.	45	Johnson-Pickett Rope Co.....	63			Yarrow & Co., Ltd.	Cover
Coventry Chain Co., Ltd.	52						
Crashaw Pat. Pile Helmet Co.	36						

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(Please mention this journal)

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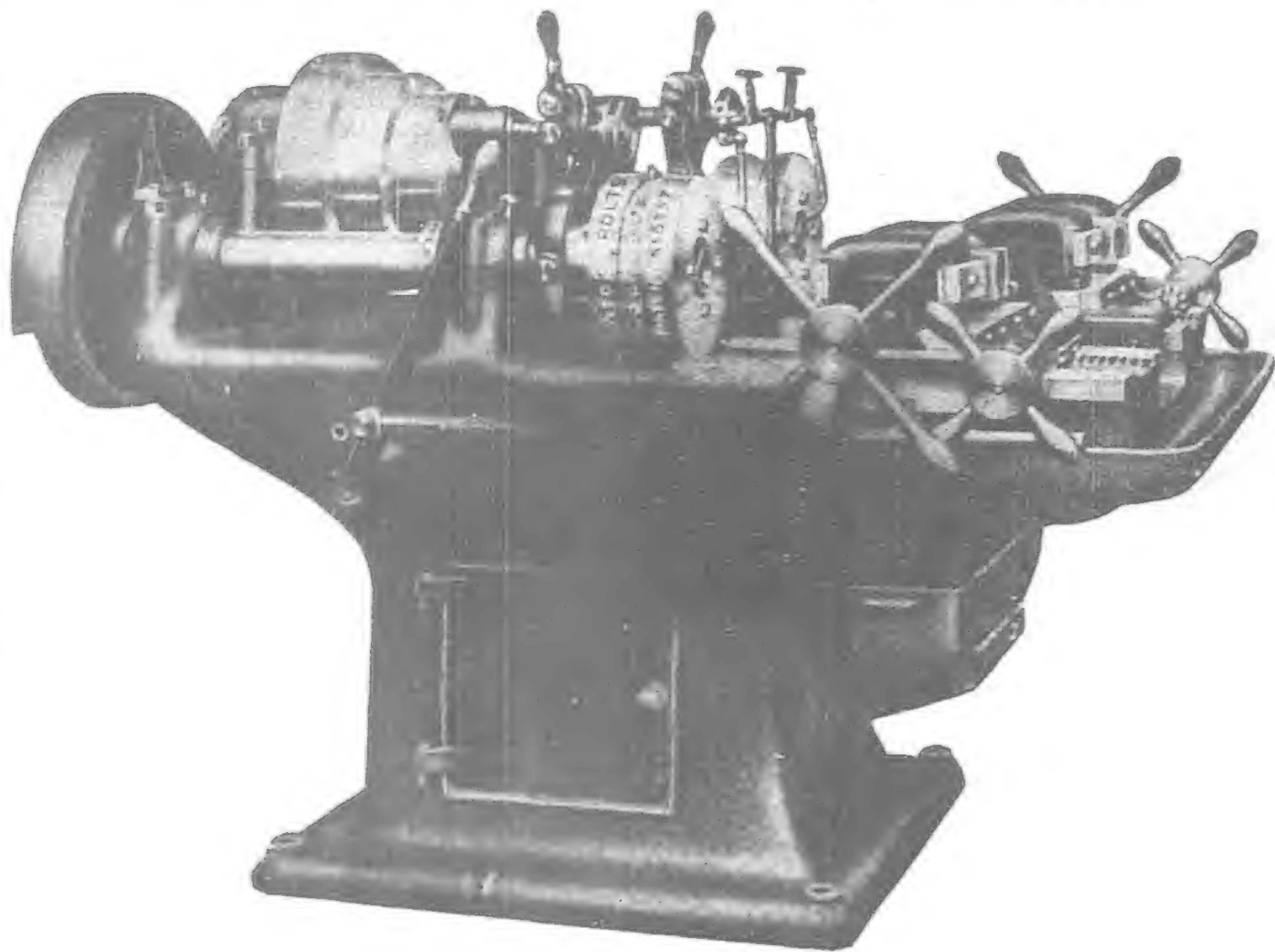
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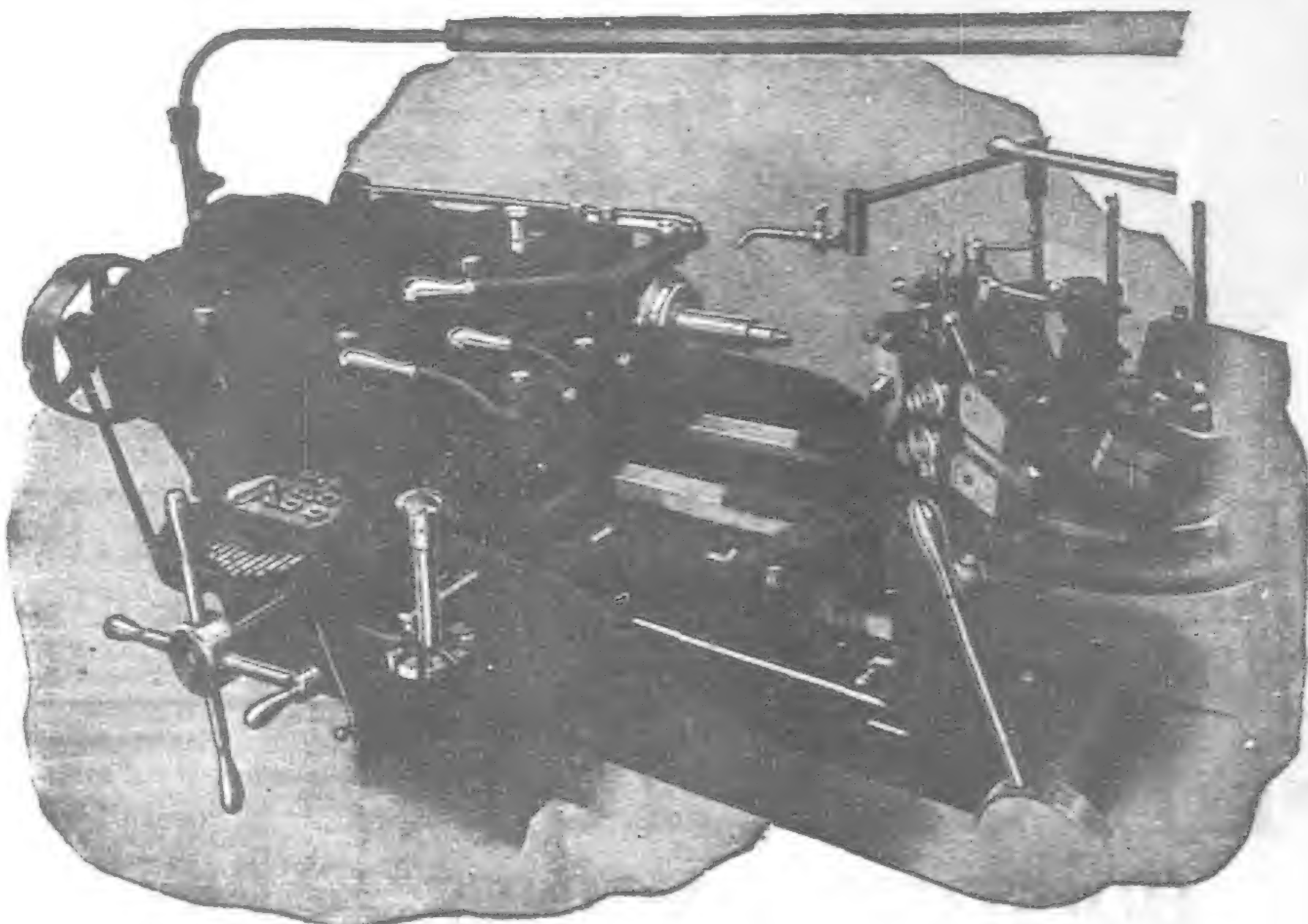
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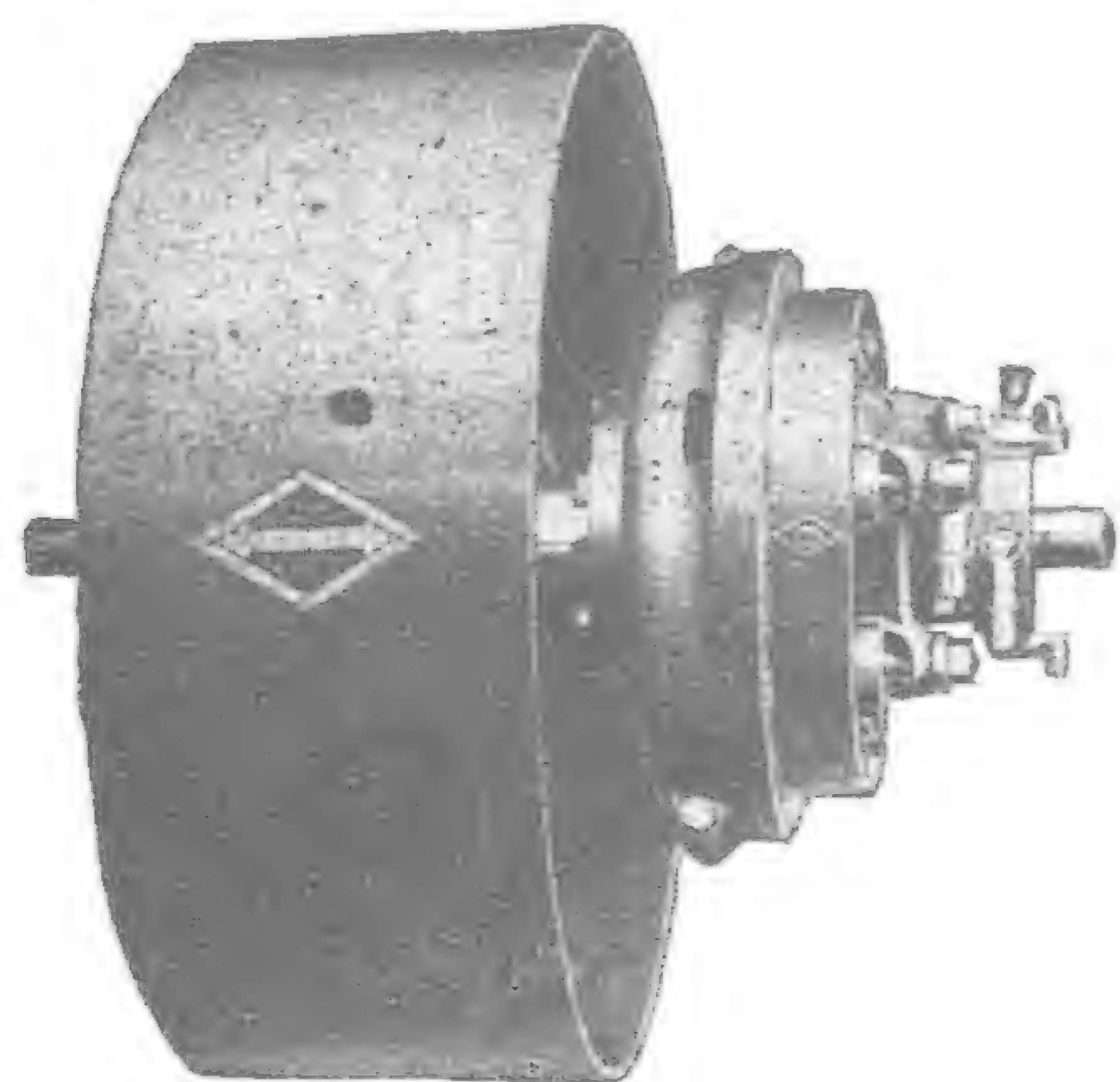
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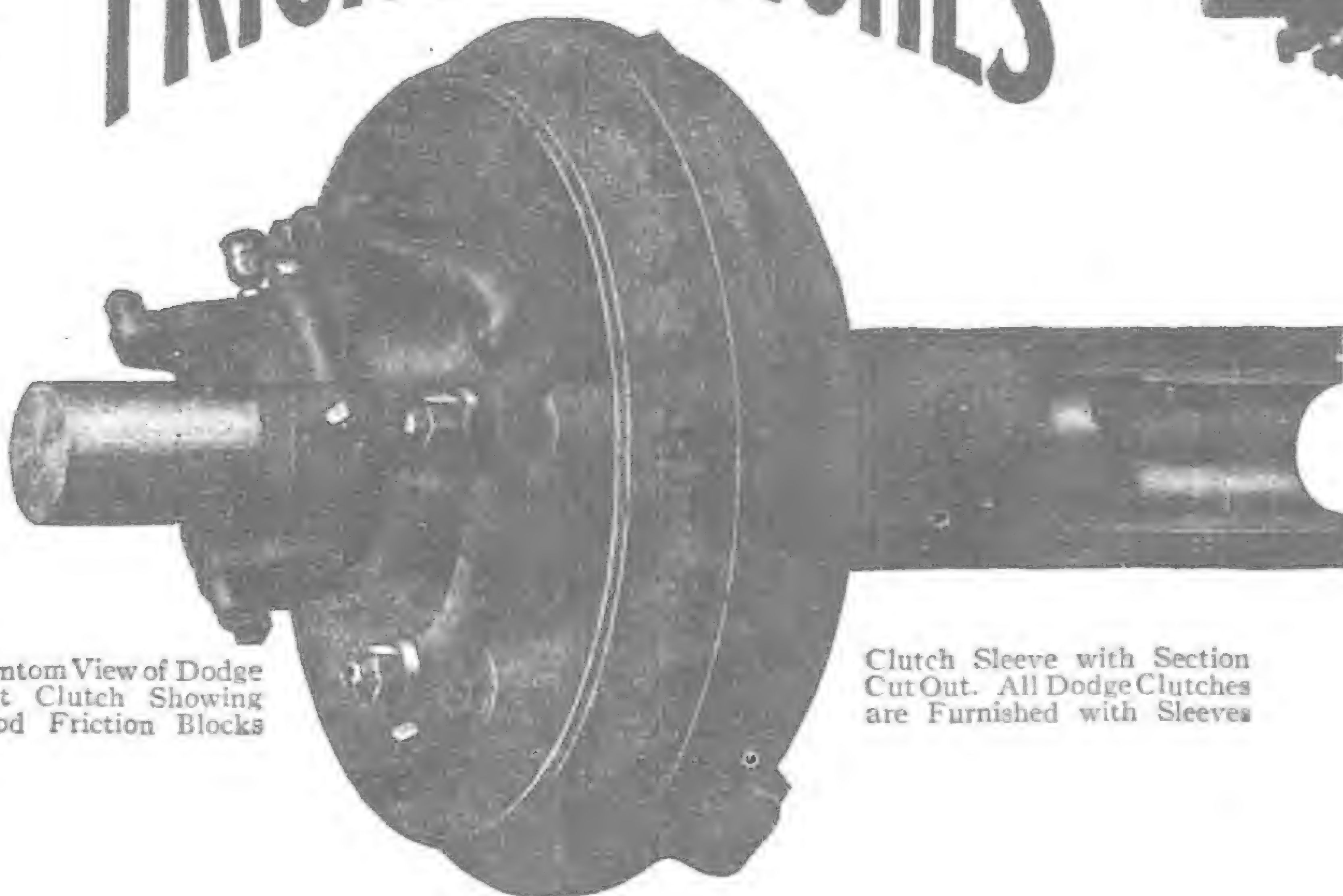
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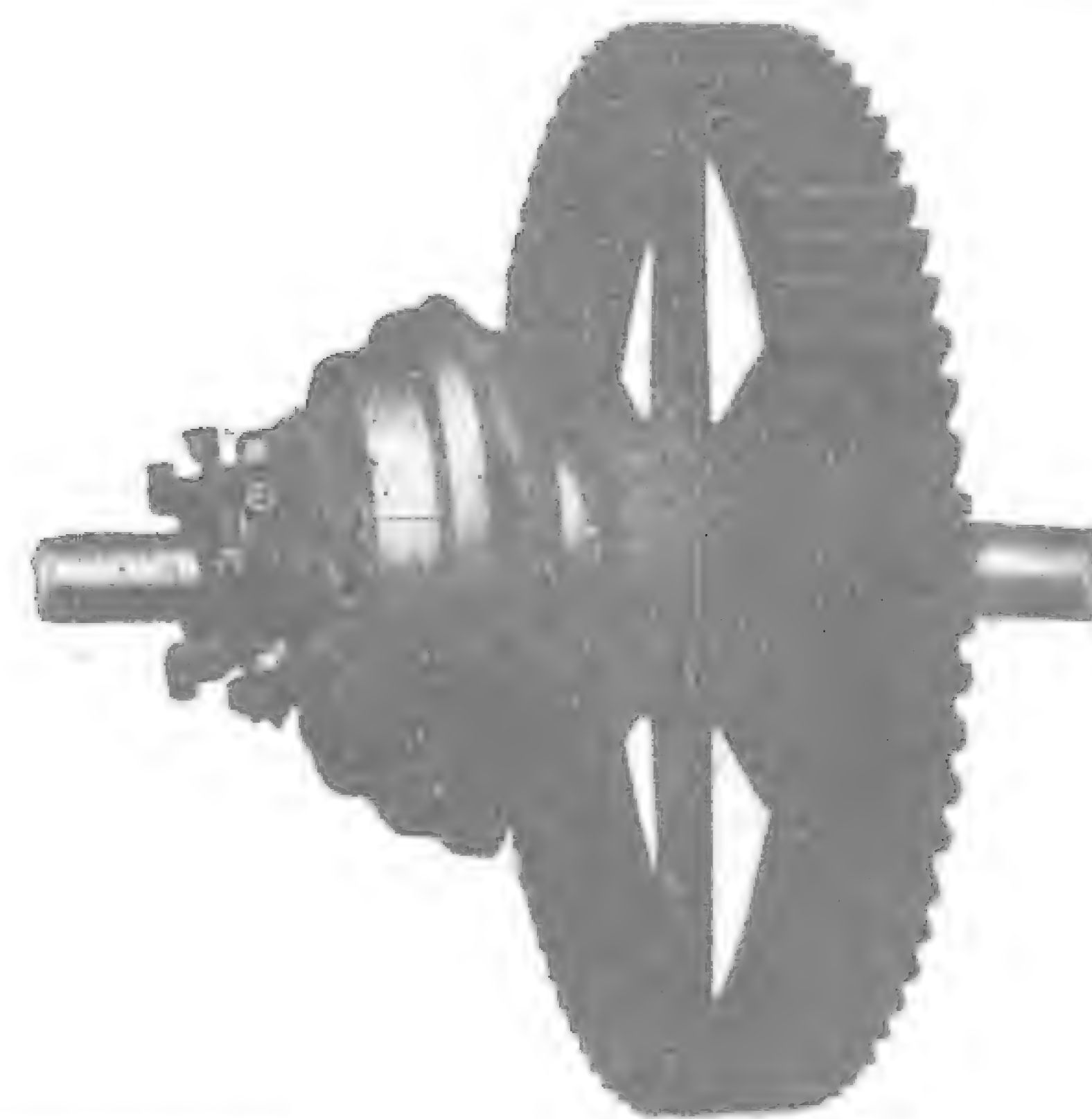
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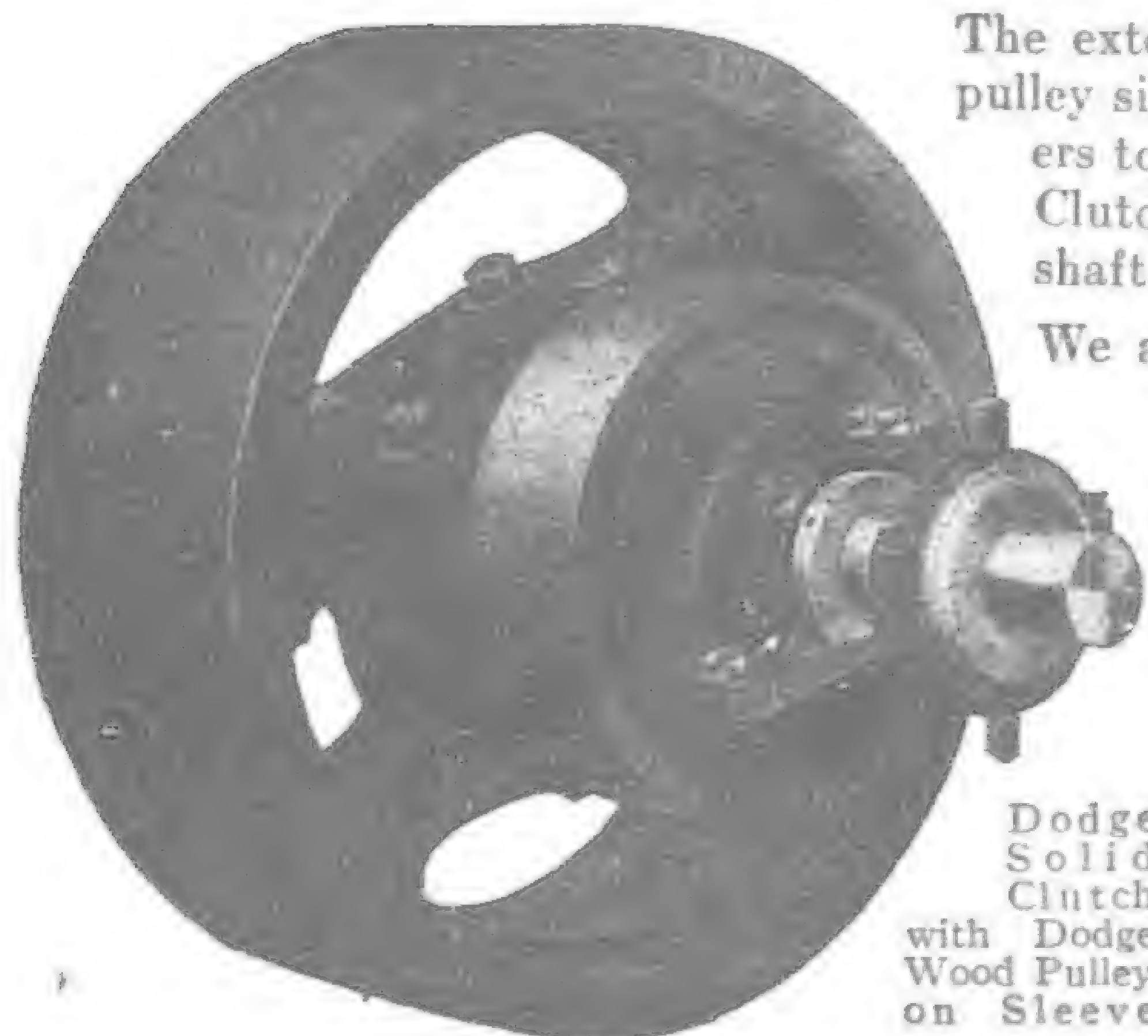
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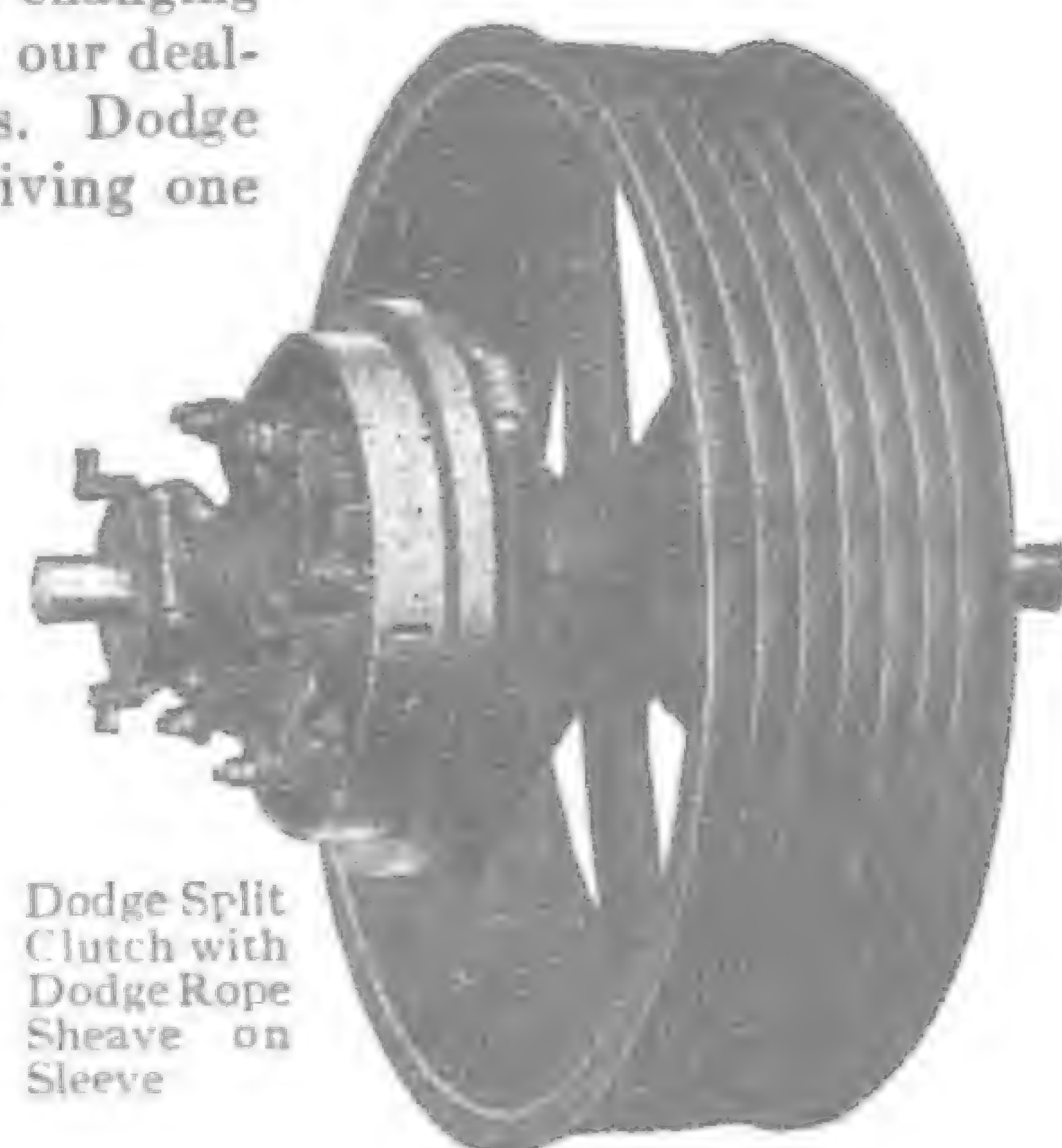
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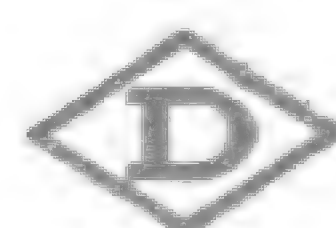
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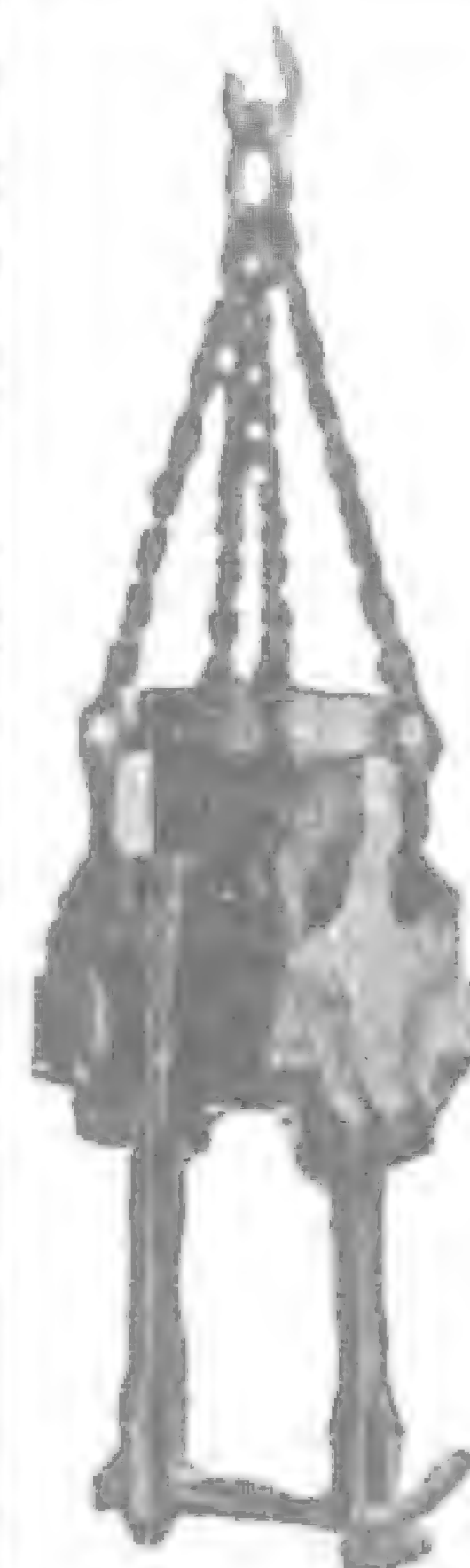
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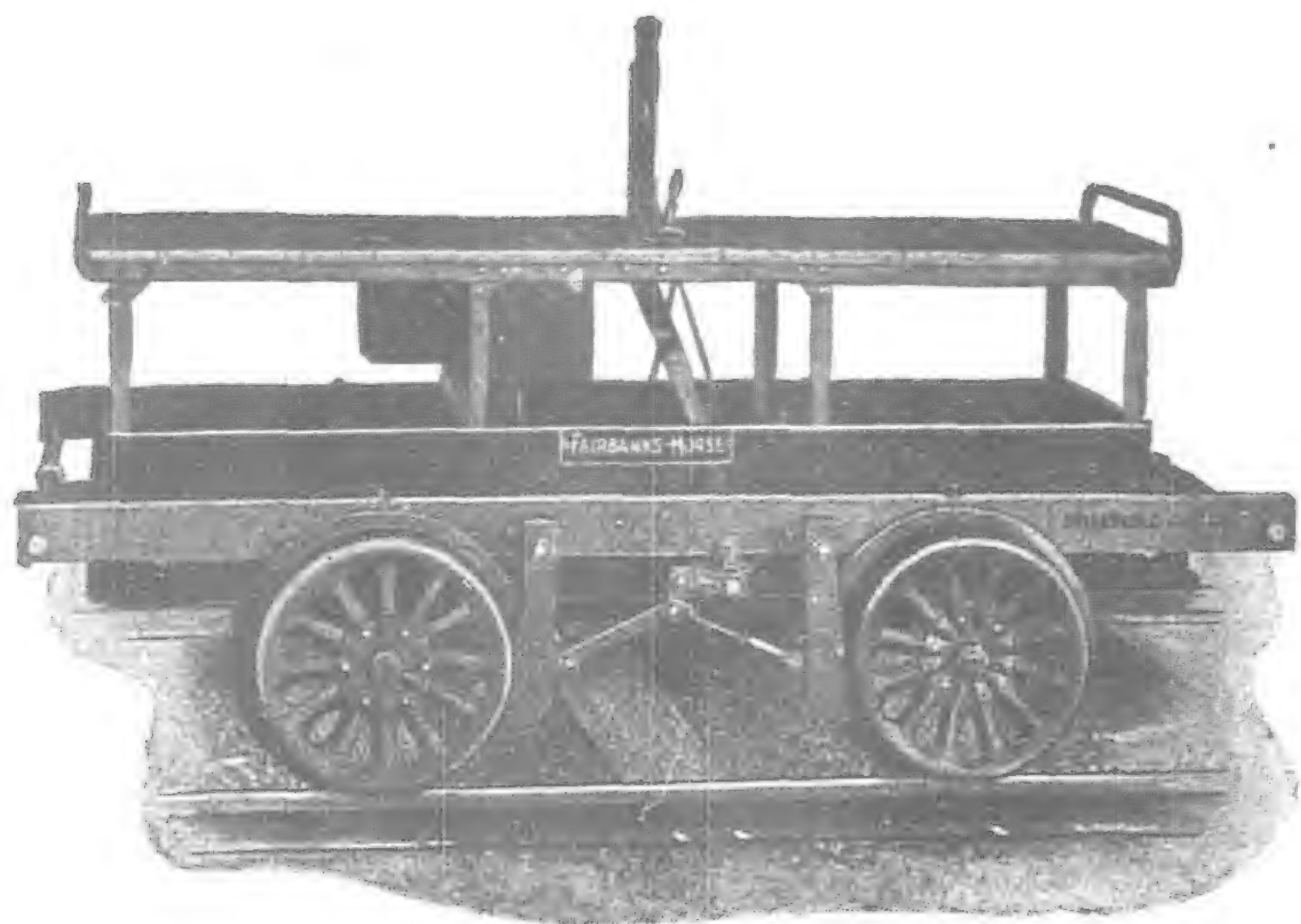
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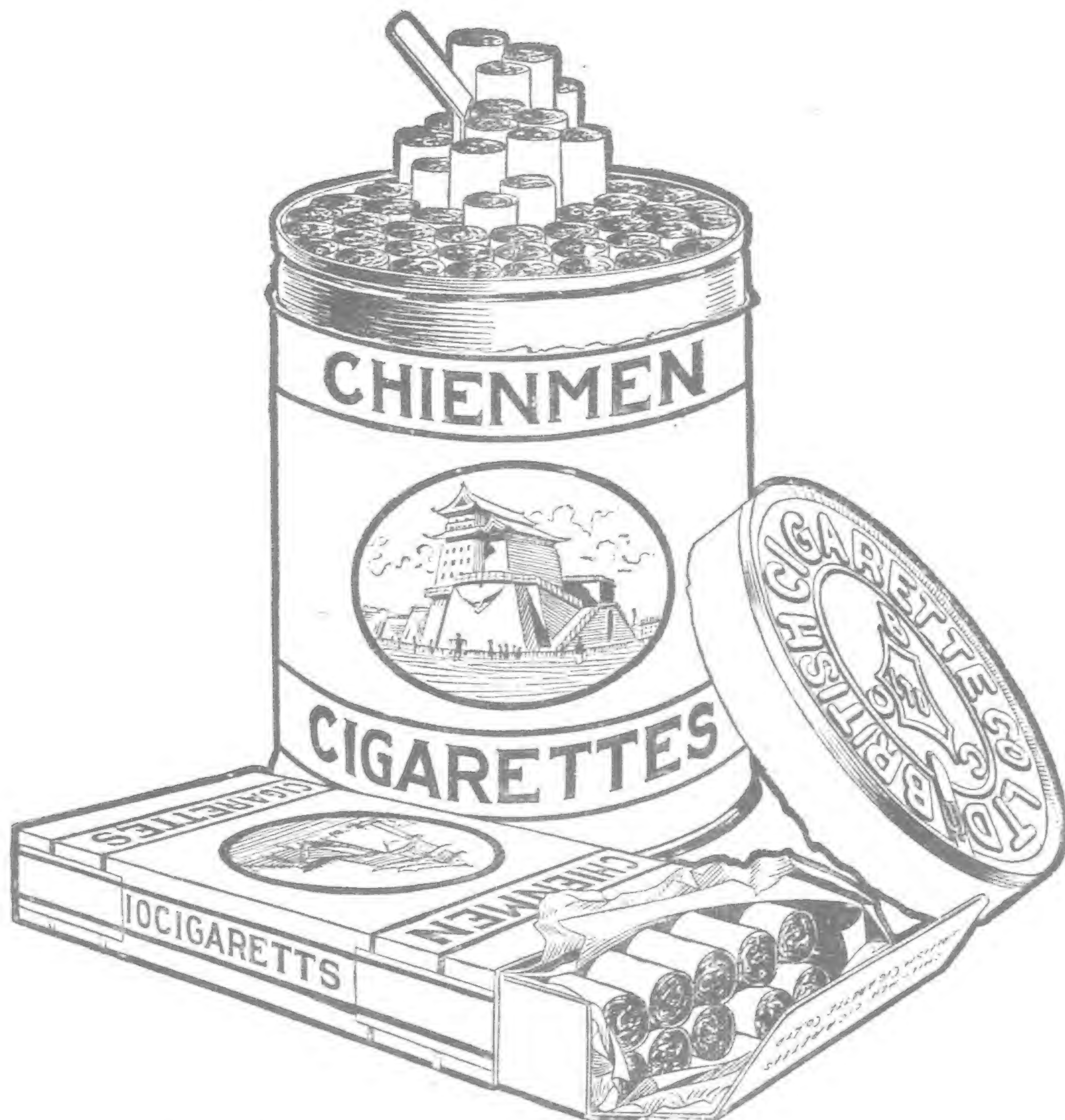
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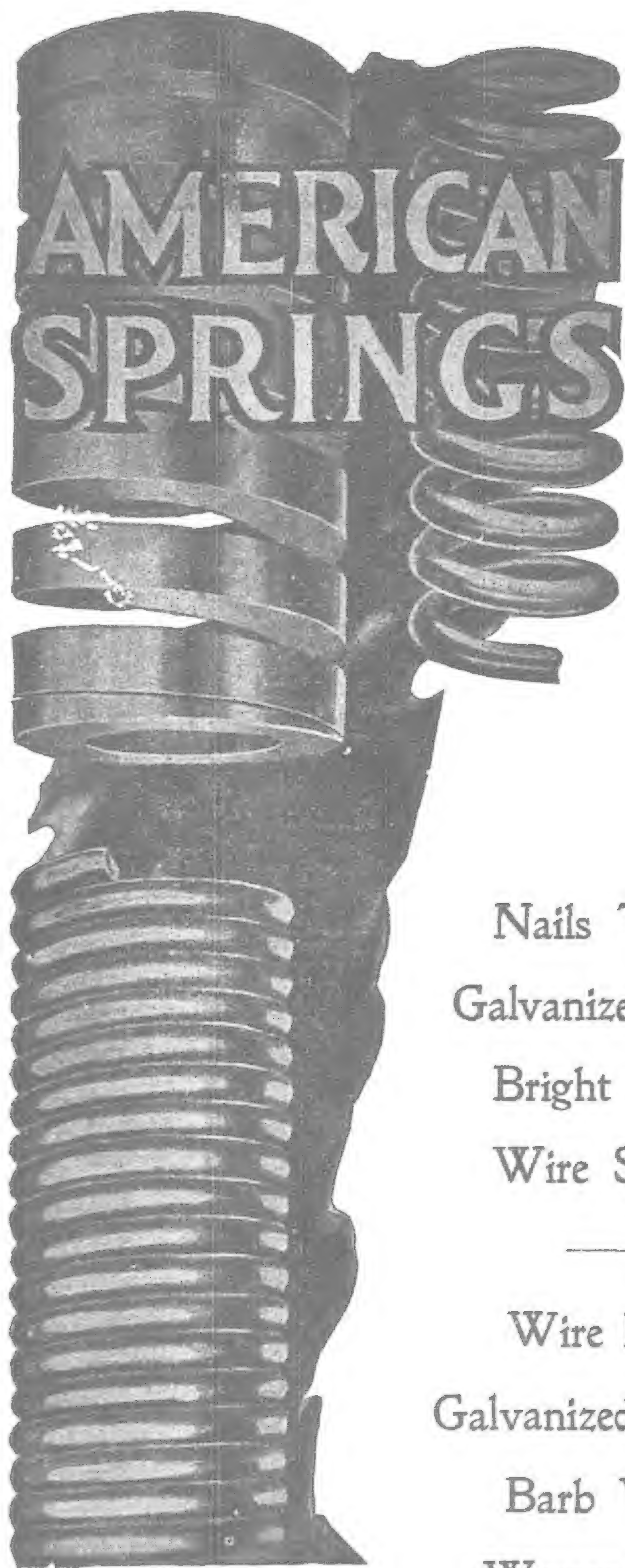
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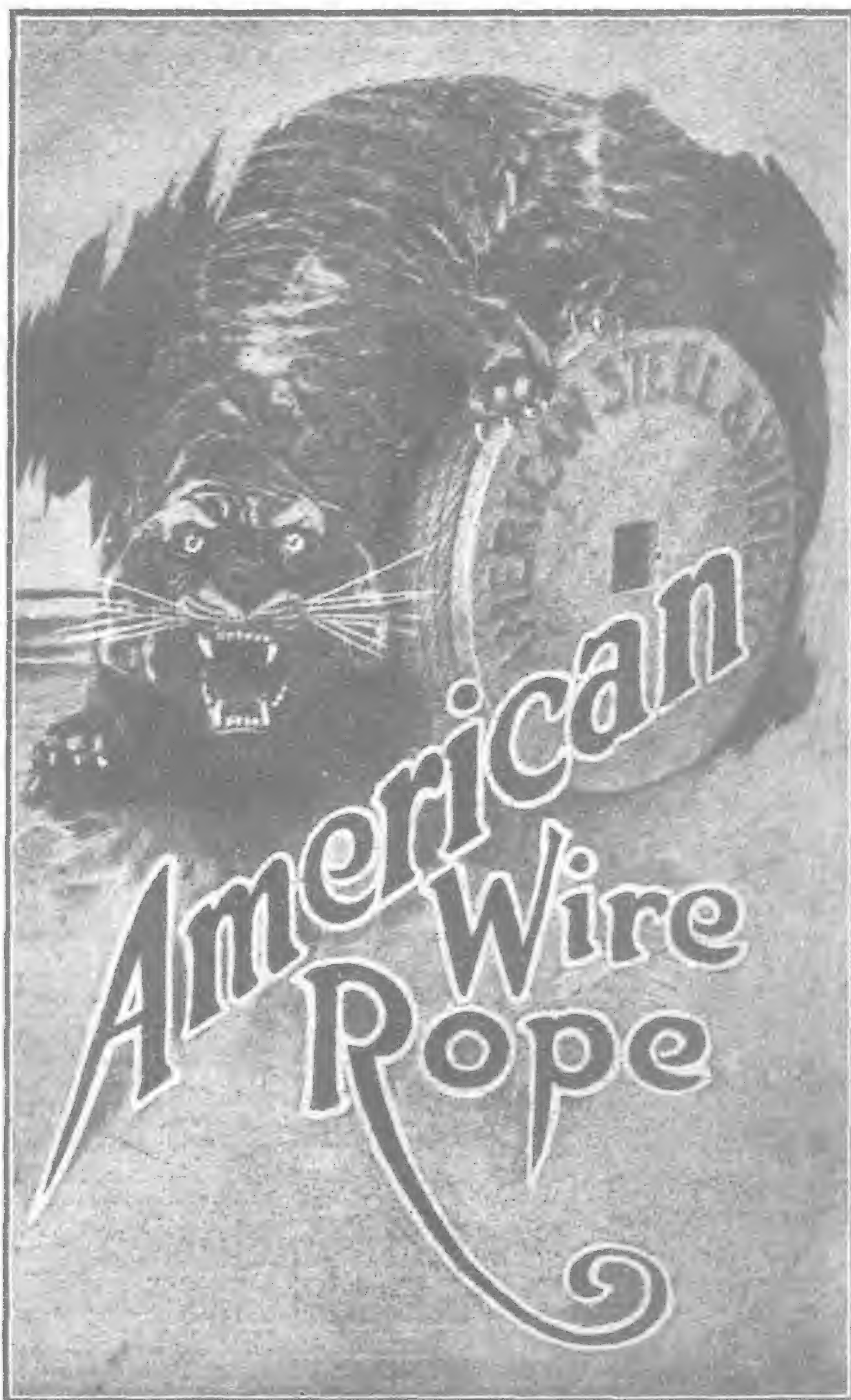
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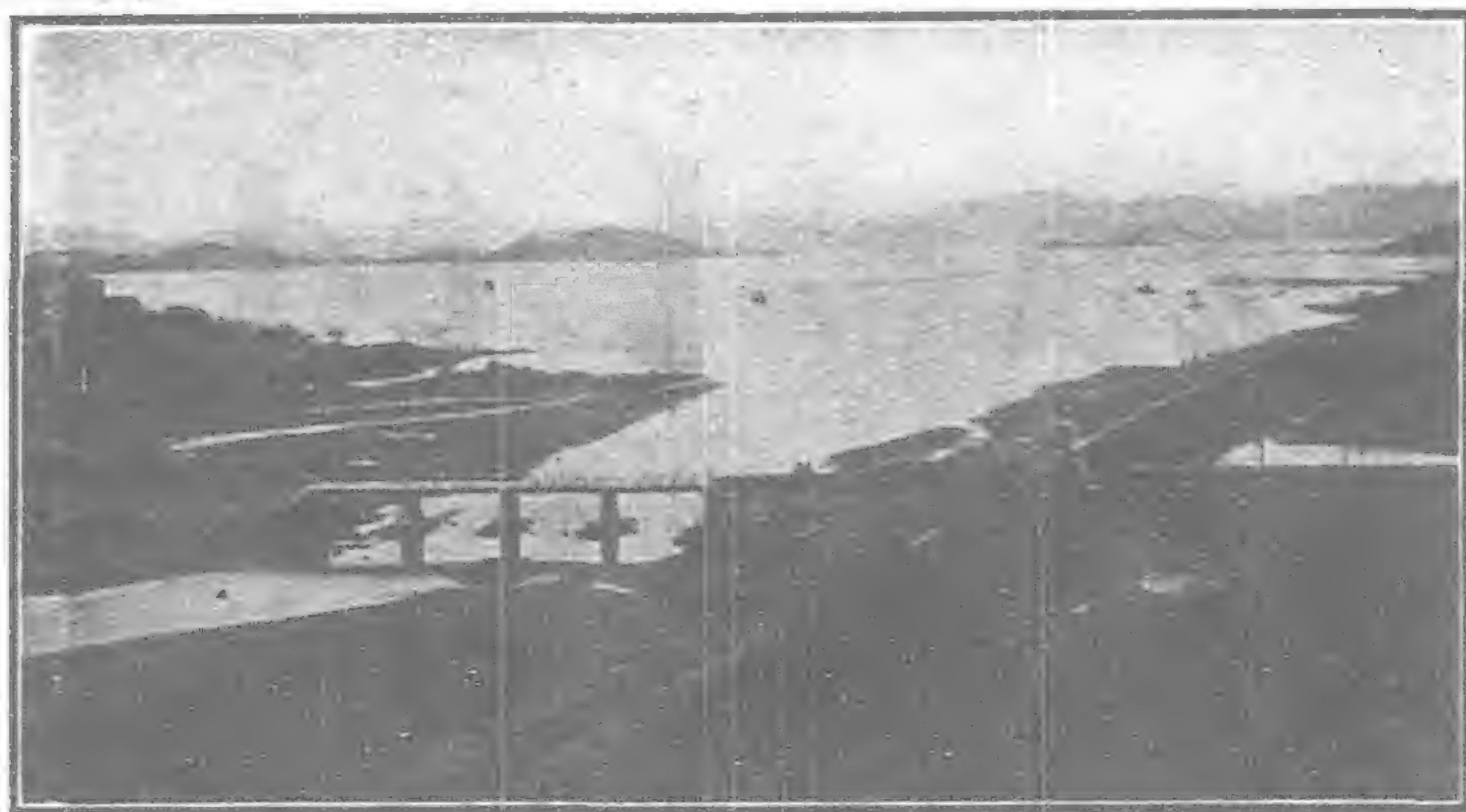
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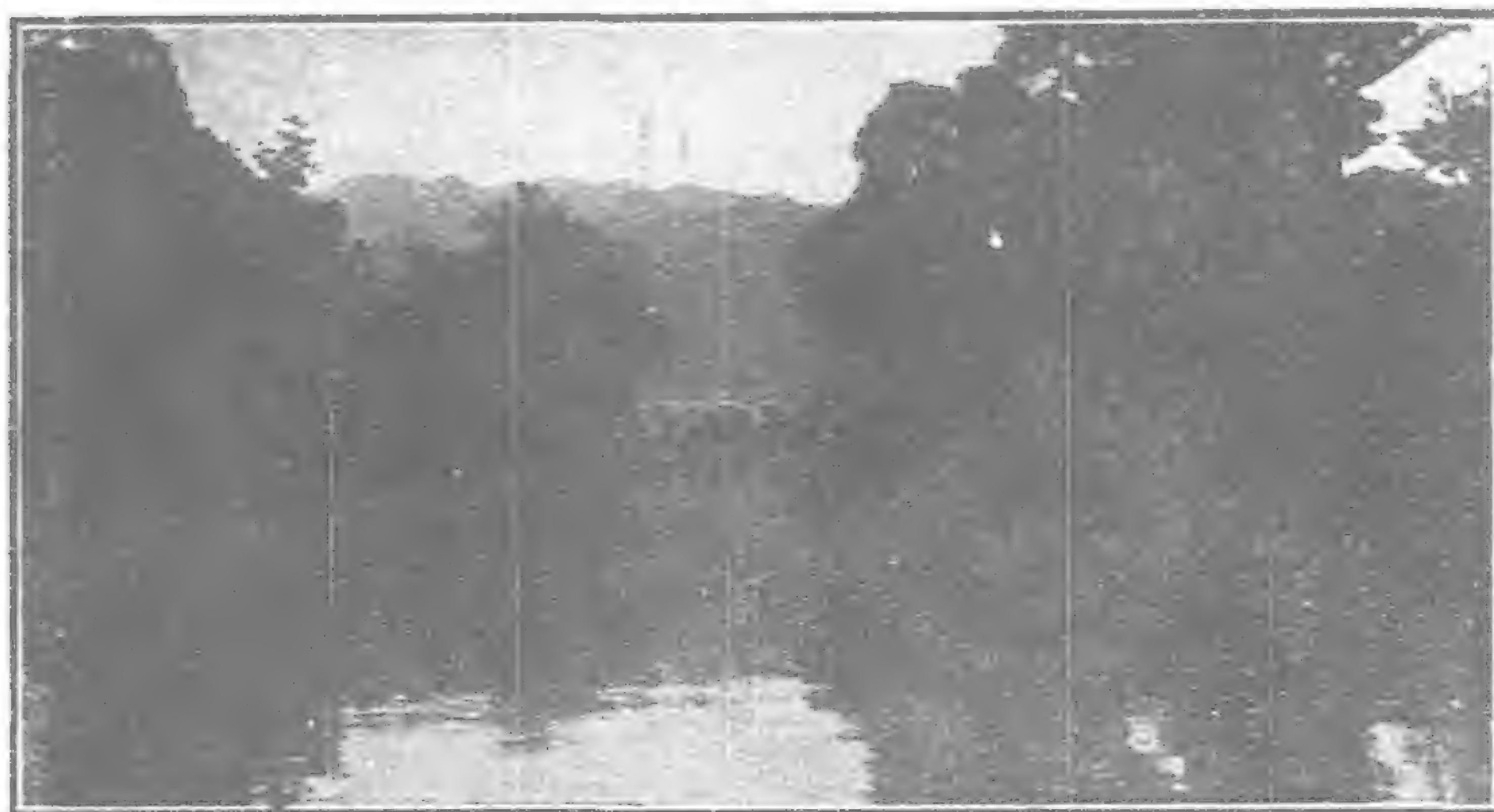


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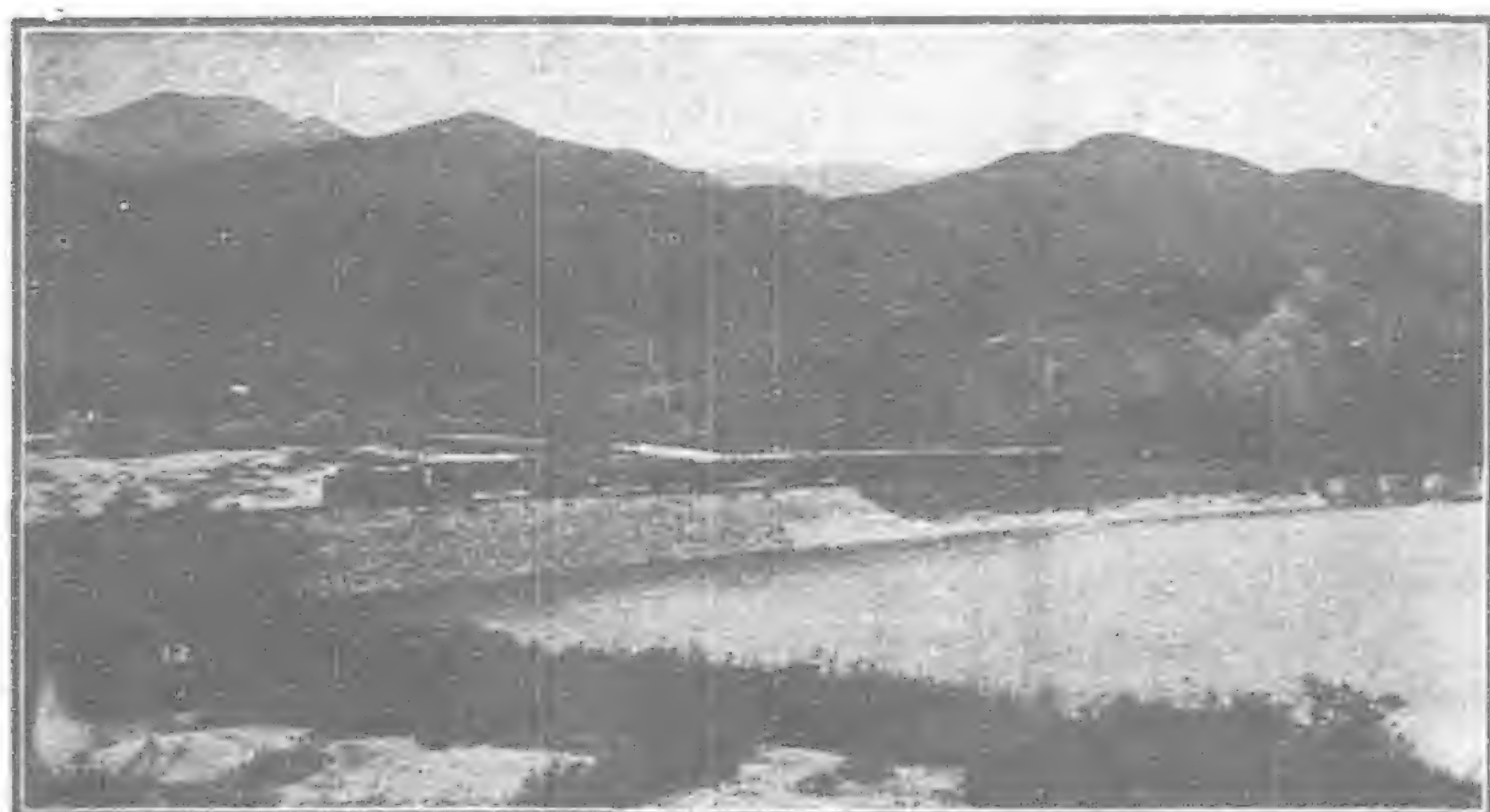


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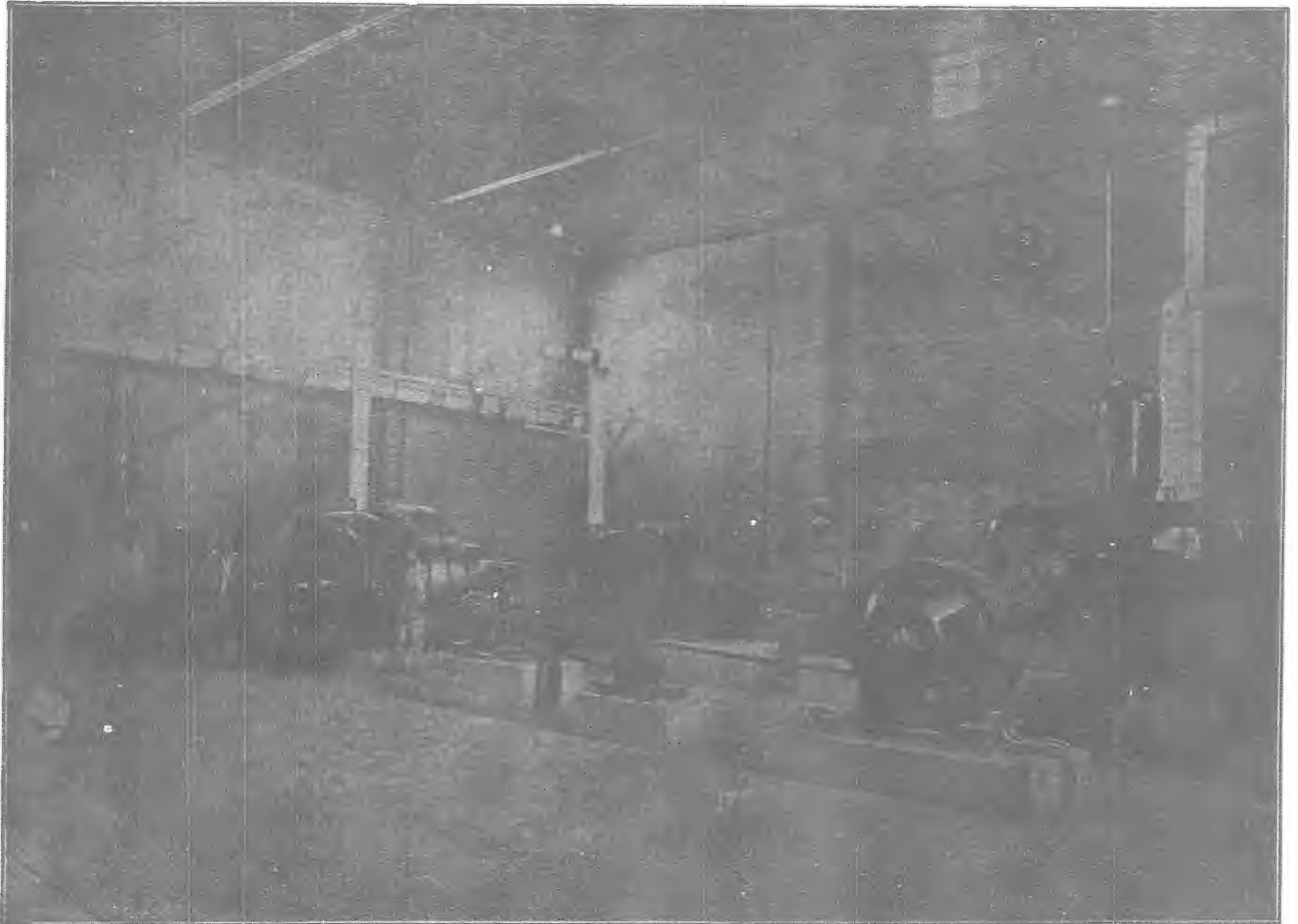


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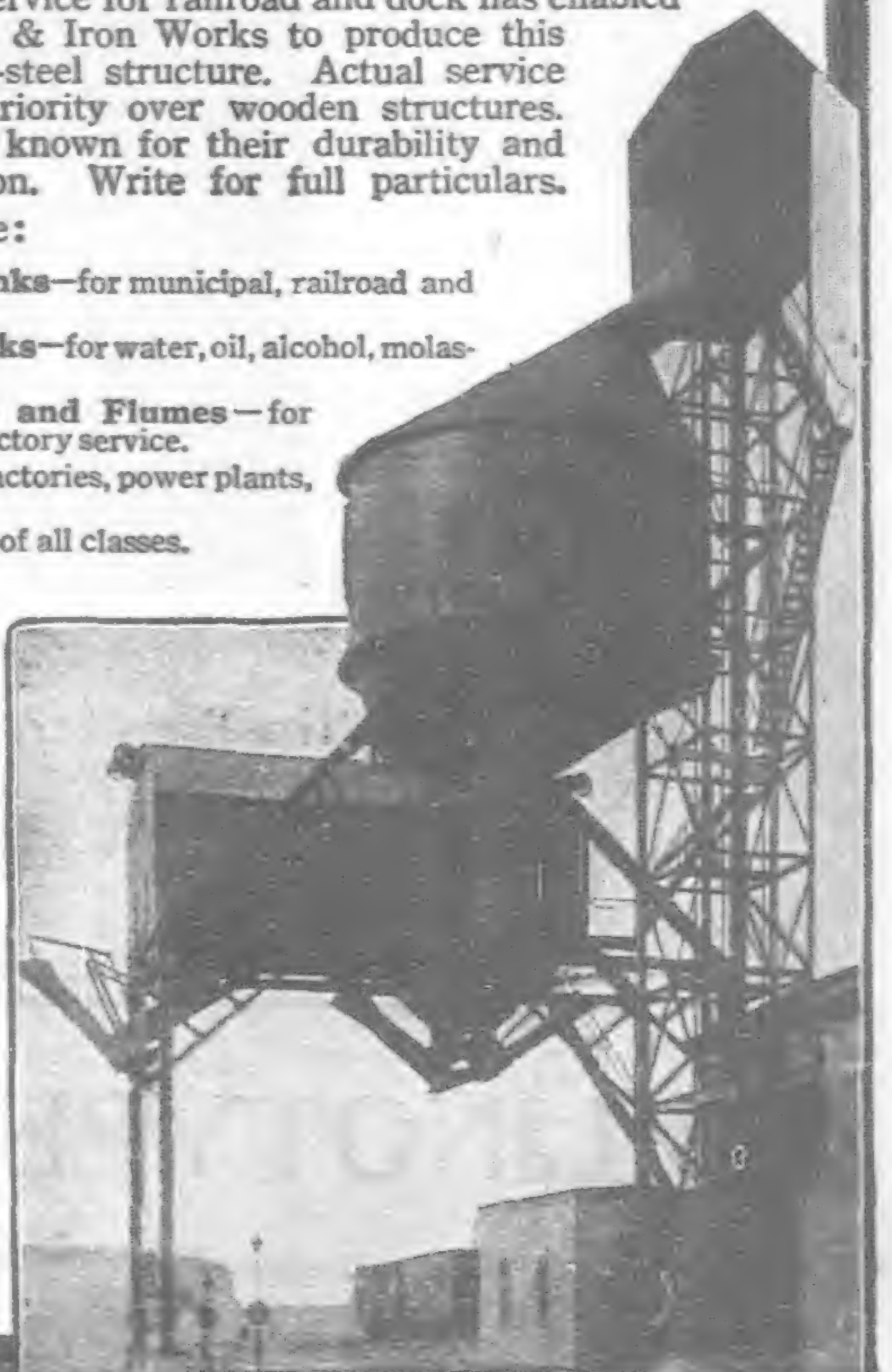
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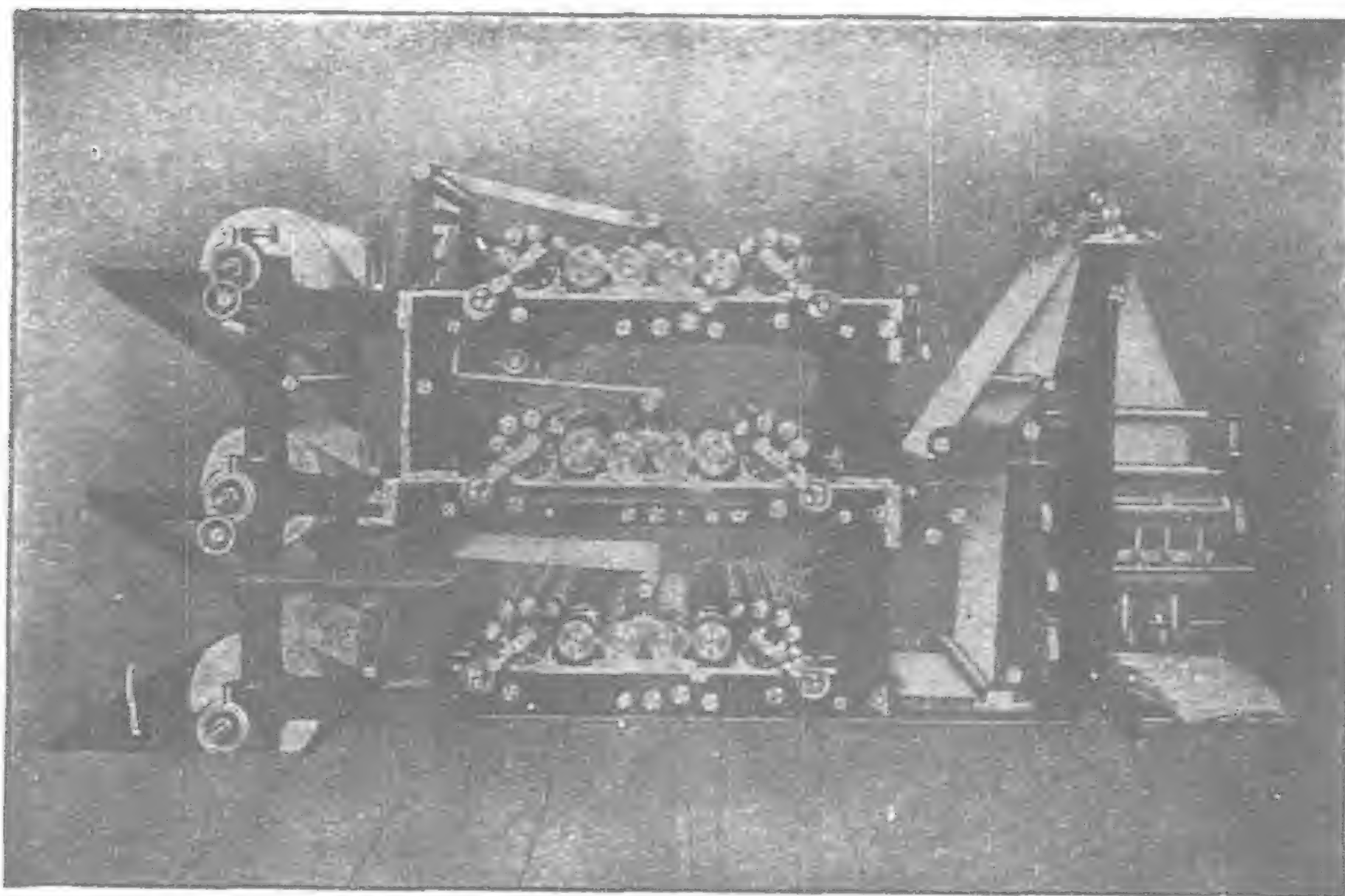
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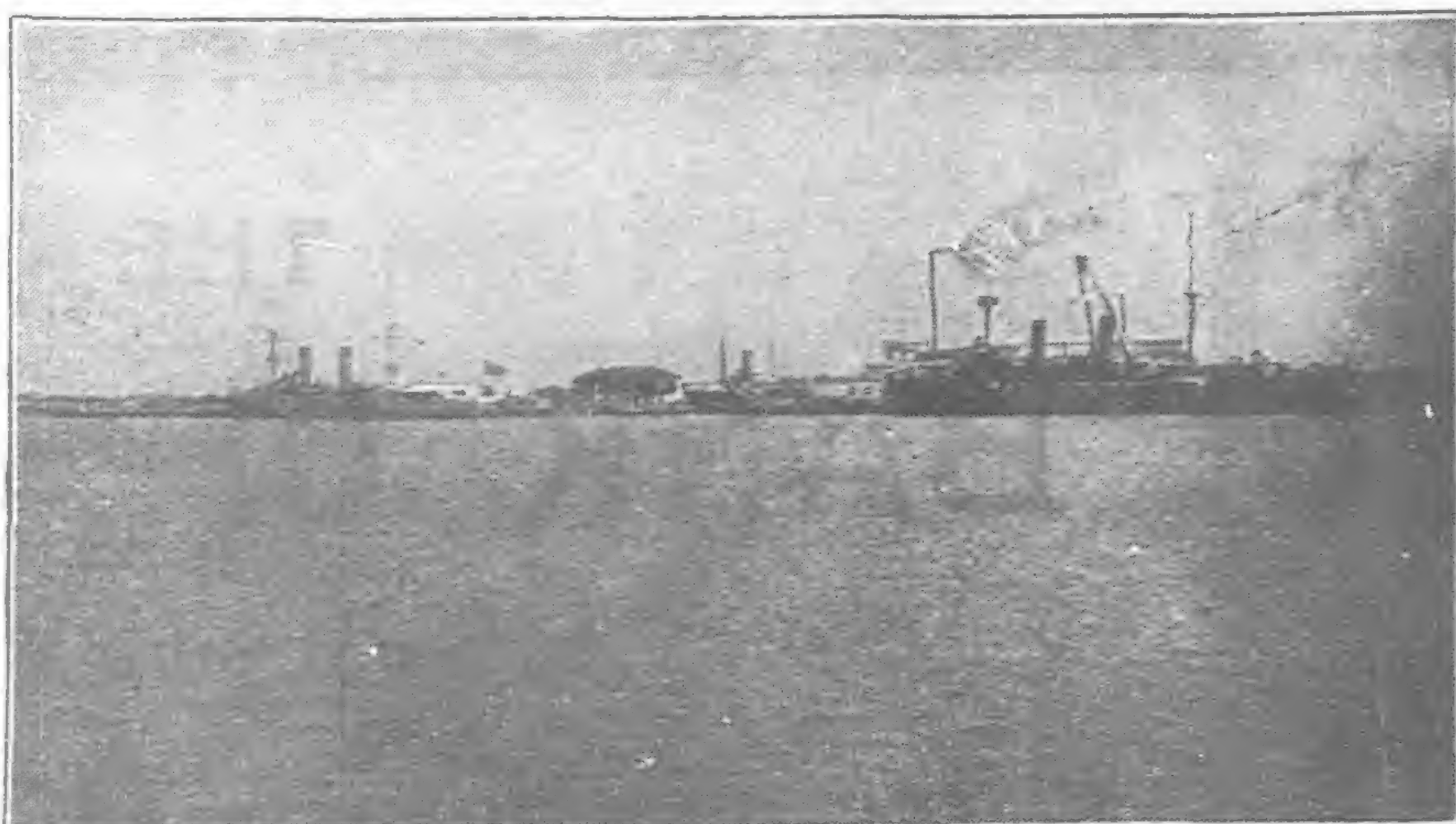
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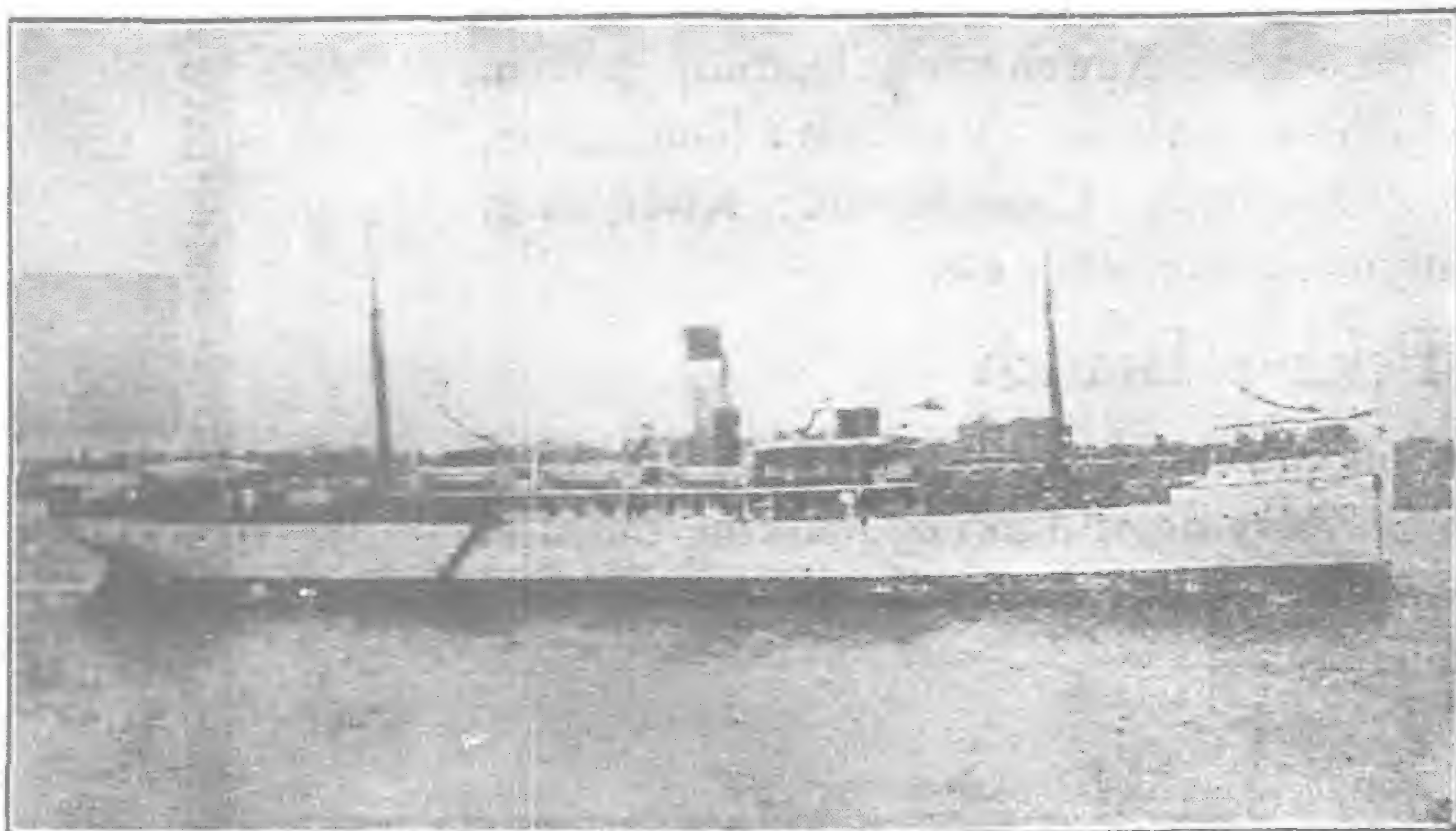
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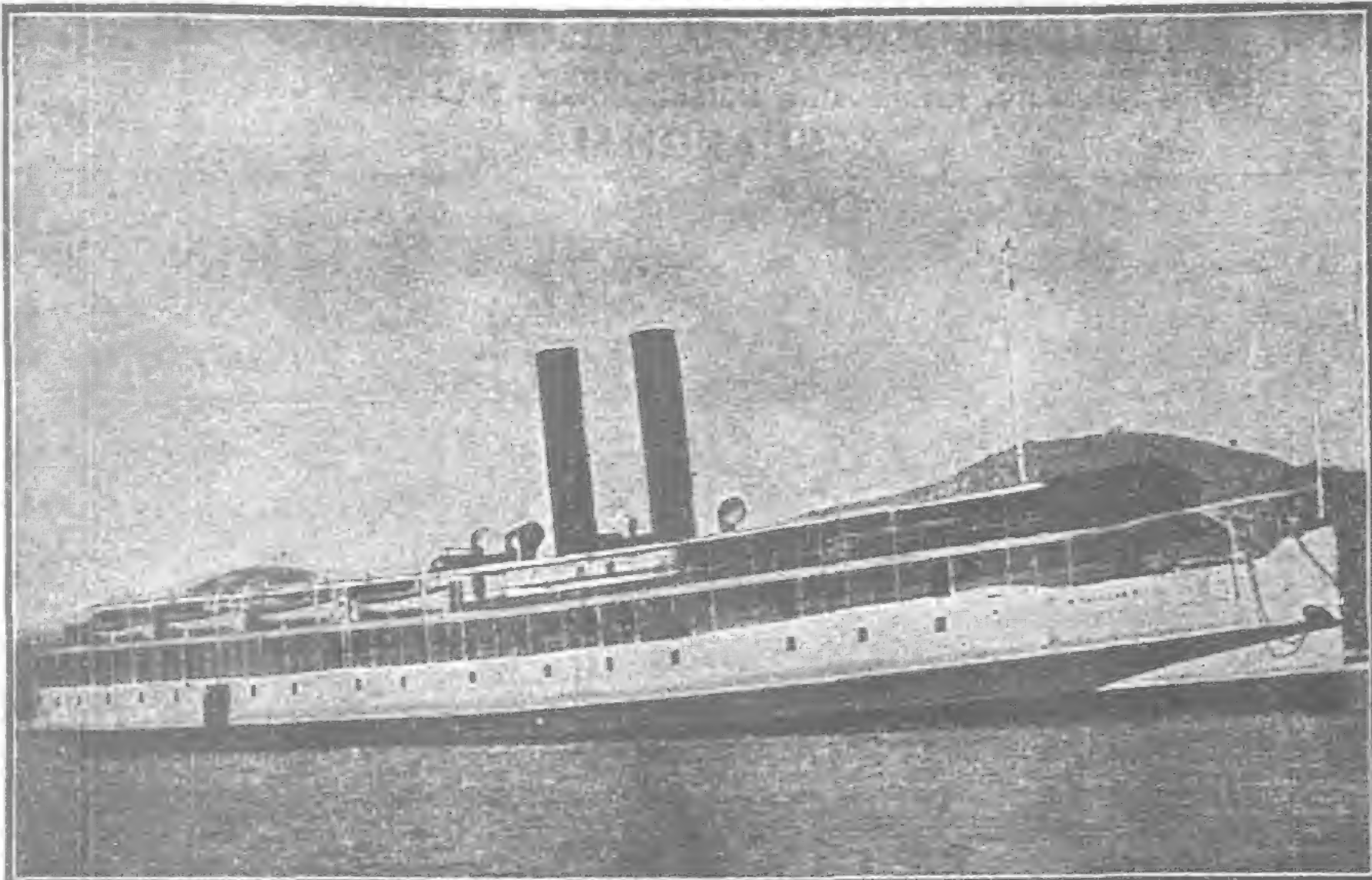
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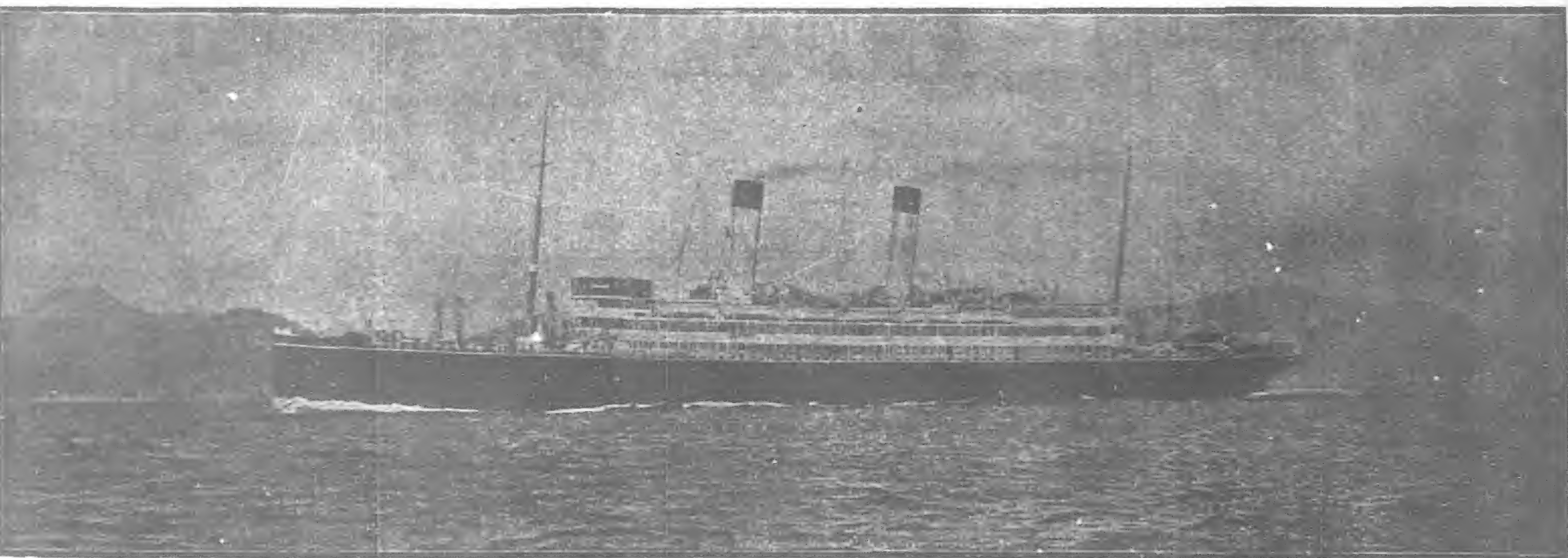
Name of Dock or Slip	Length on Keel Blocks	Entrance Breadth	Depth Over Sill at Ordinary Spring Tides	Rise of Tide	
				Springs	Neaps
KOWLOON					
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No. 2 Dock, Kowloon . . .	371	74'	18' 6"	7' 6"	—
No. 3 Dock, Kowloon . . .	264	49' 3"	14'	7' 6"	—
Patent Slip, No. 1, Kowloon	240	60'	14'	7' 6"	—
Patent Slip, No. 2, Kowloon	220	60'	12'	7' 6"	—
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" " " " Bottom	77	"	" " " " Bottom	53	"	" " " " Bottom	88½	"
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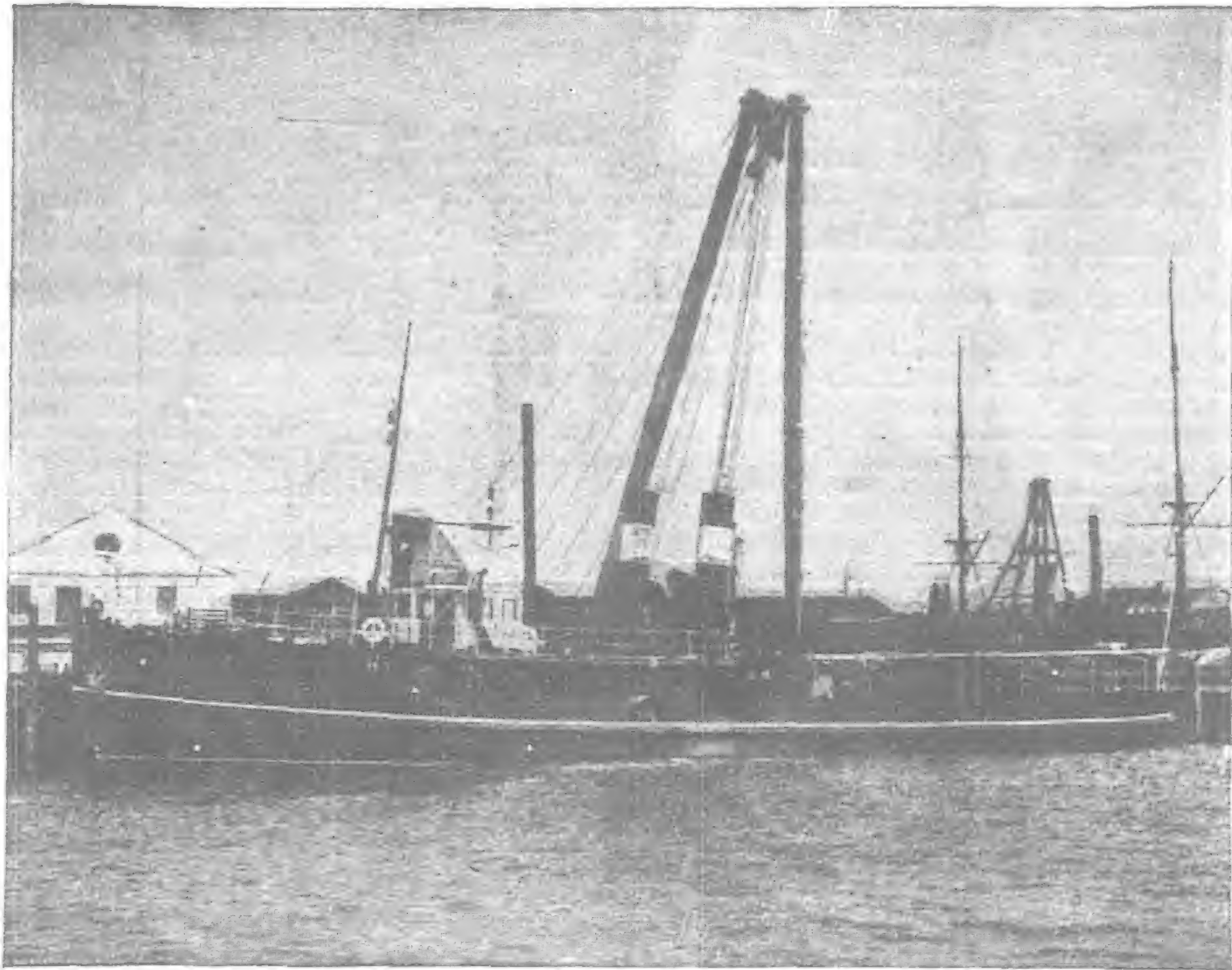
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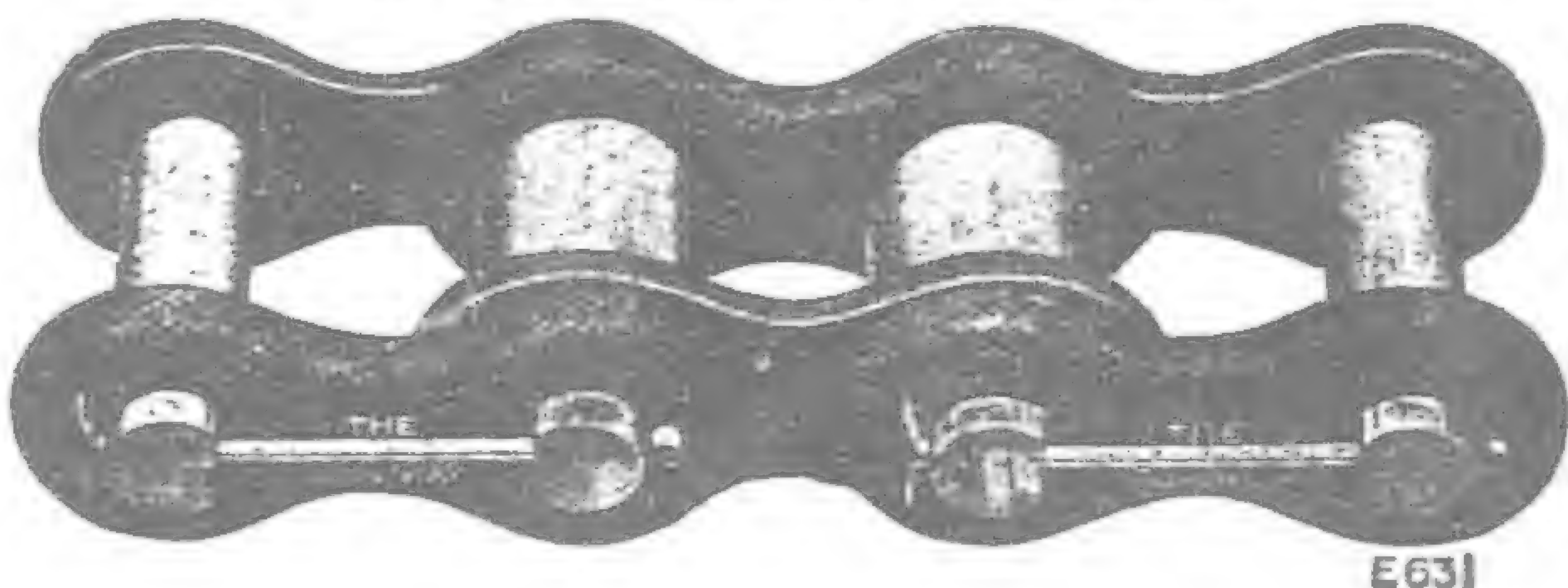
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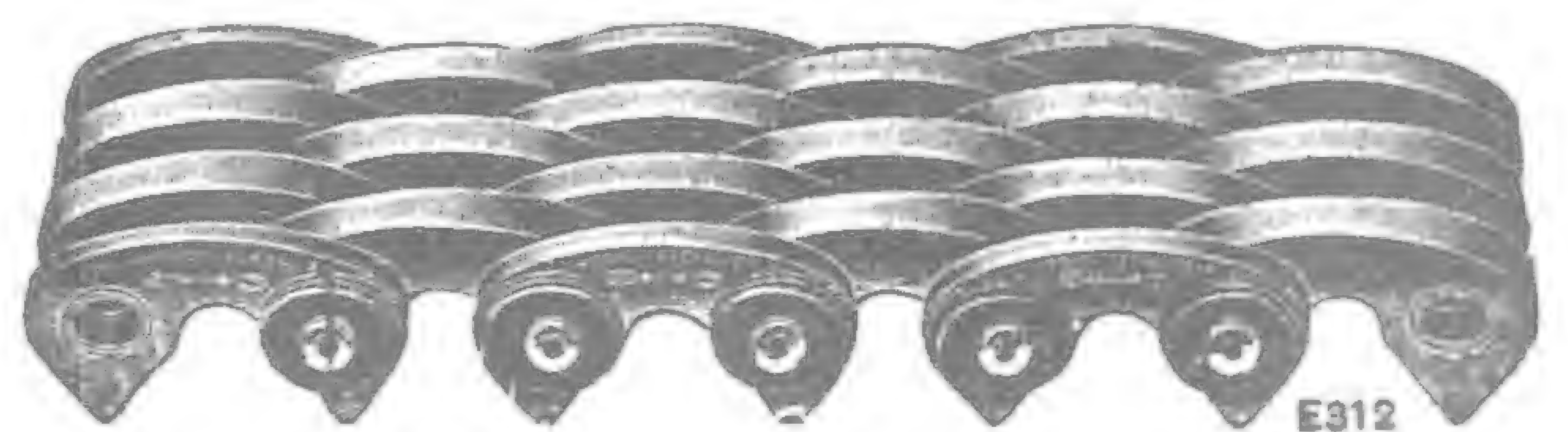
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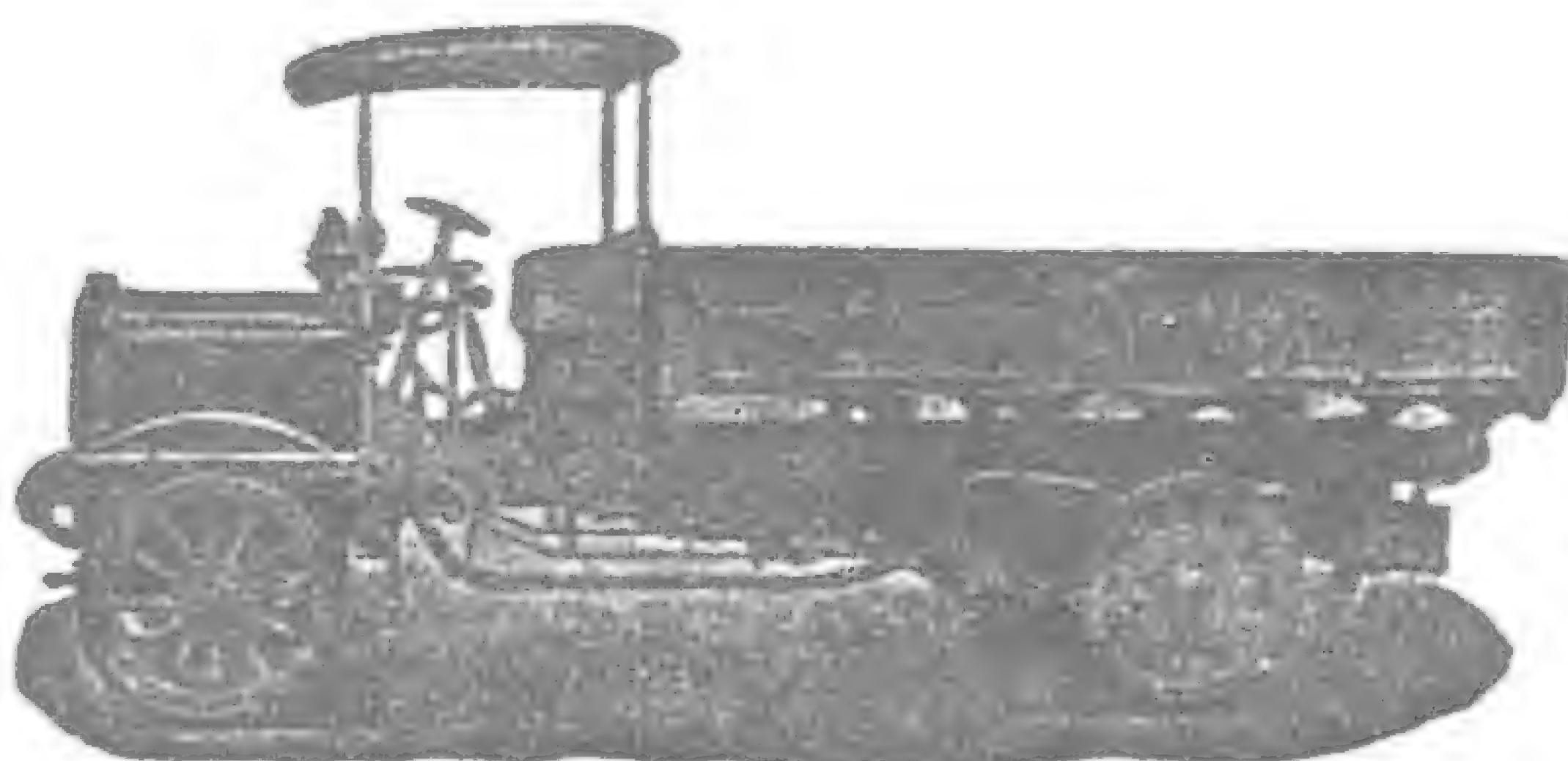


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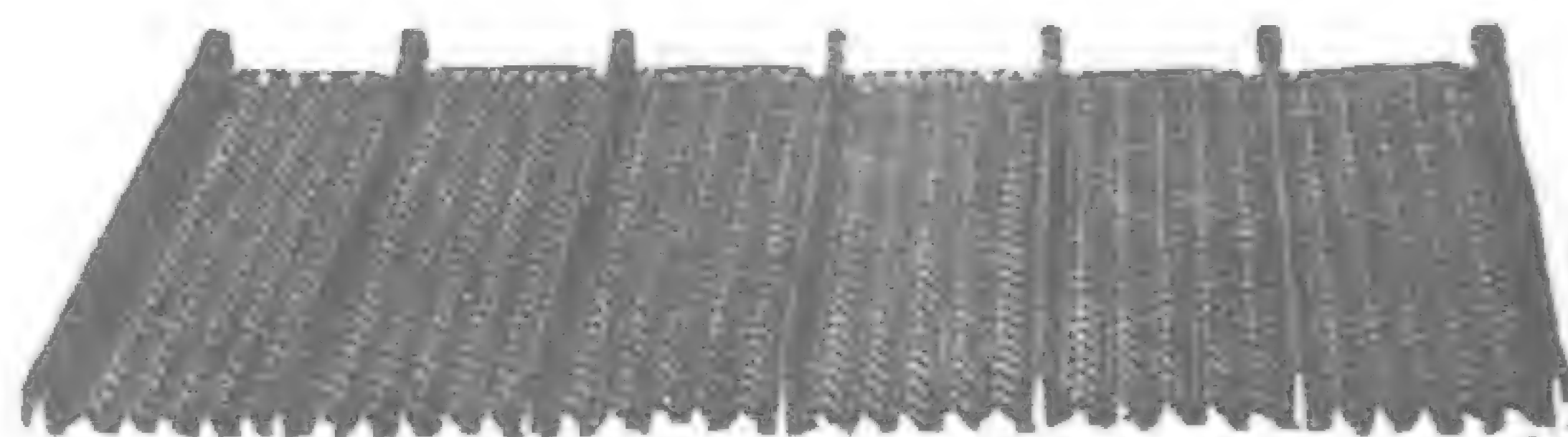
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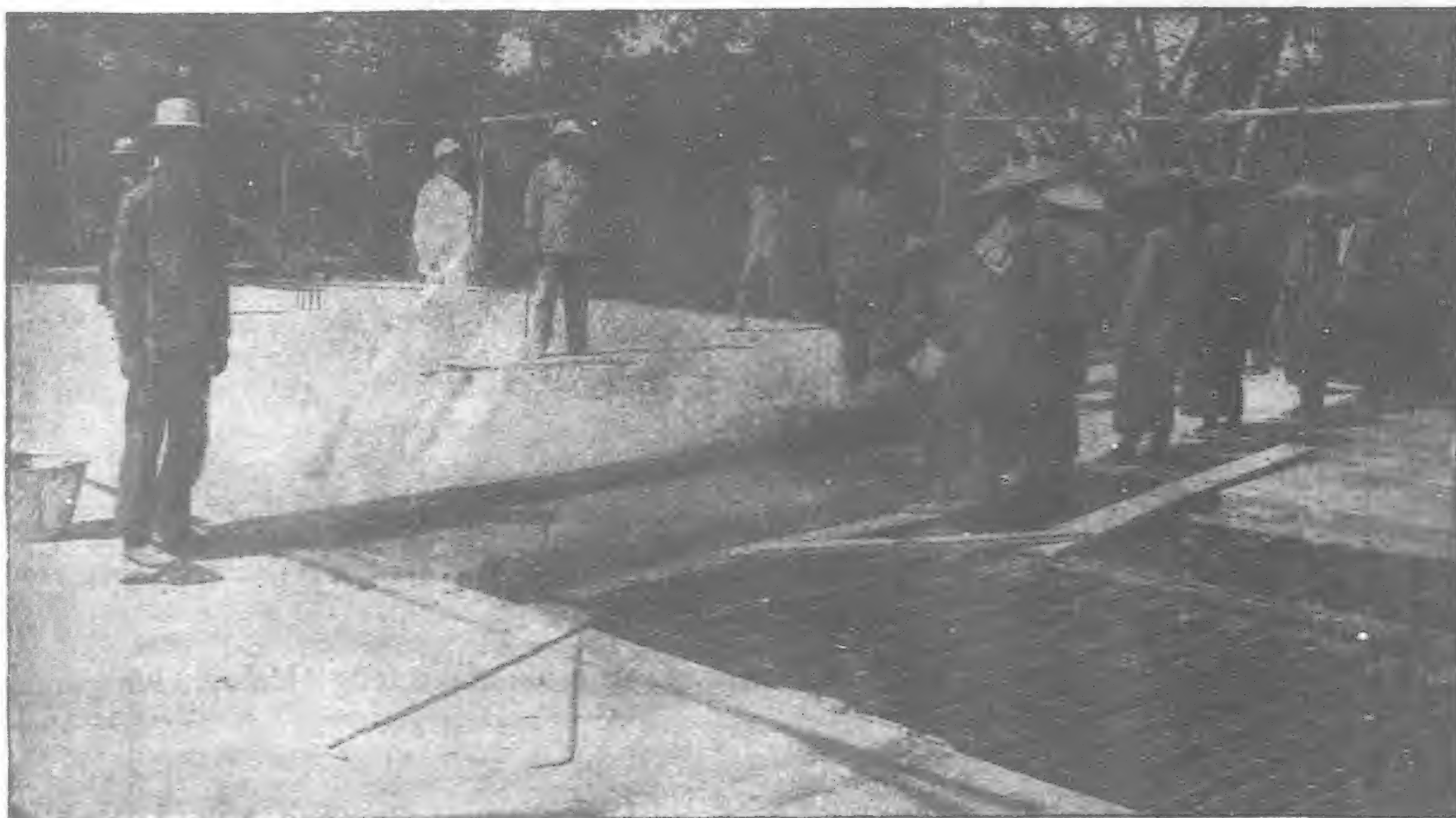
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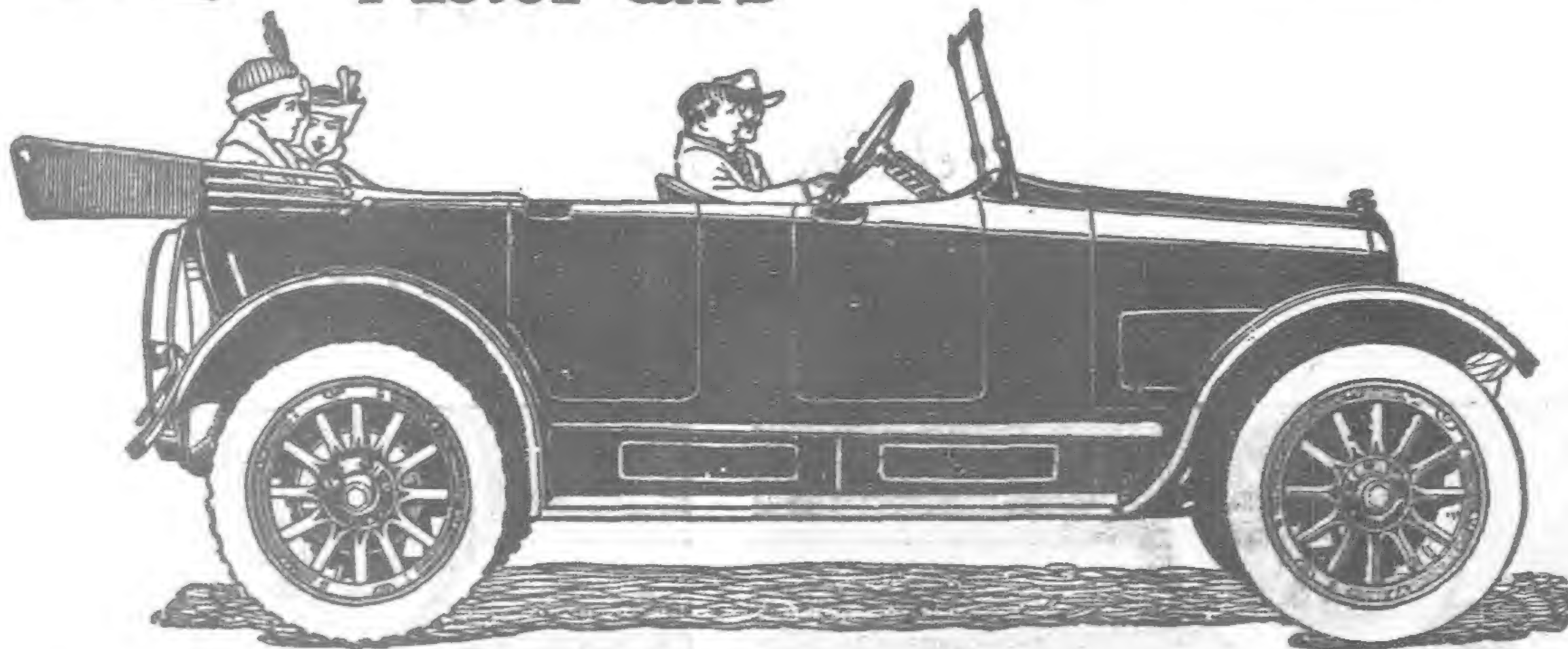
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- 4-Passenger "Country Club"

Light Six-Cylinder Overland

- 5-Passenger Touring Car
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- 3-Passenger Touring Coupe
- 5-Passenger Touring Sedan

Willys-Knight Models

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- 7-Passenger, Four-Cylinder Touring Sedan
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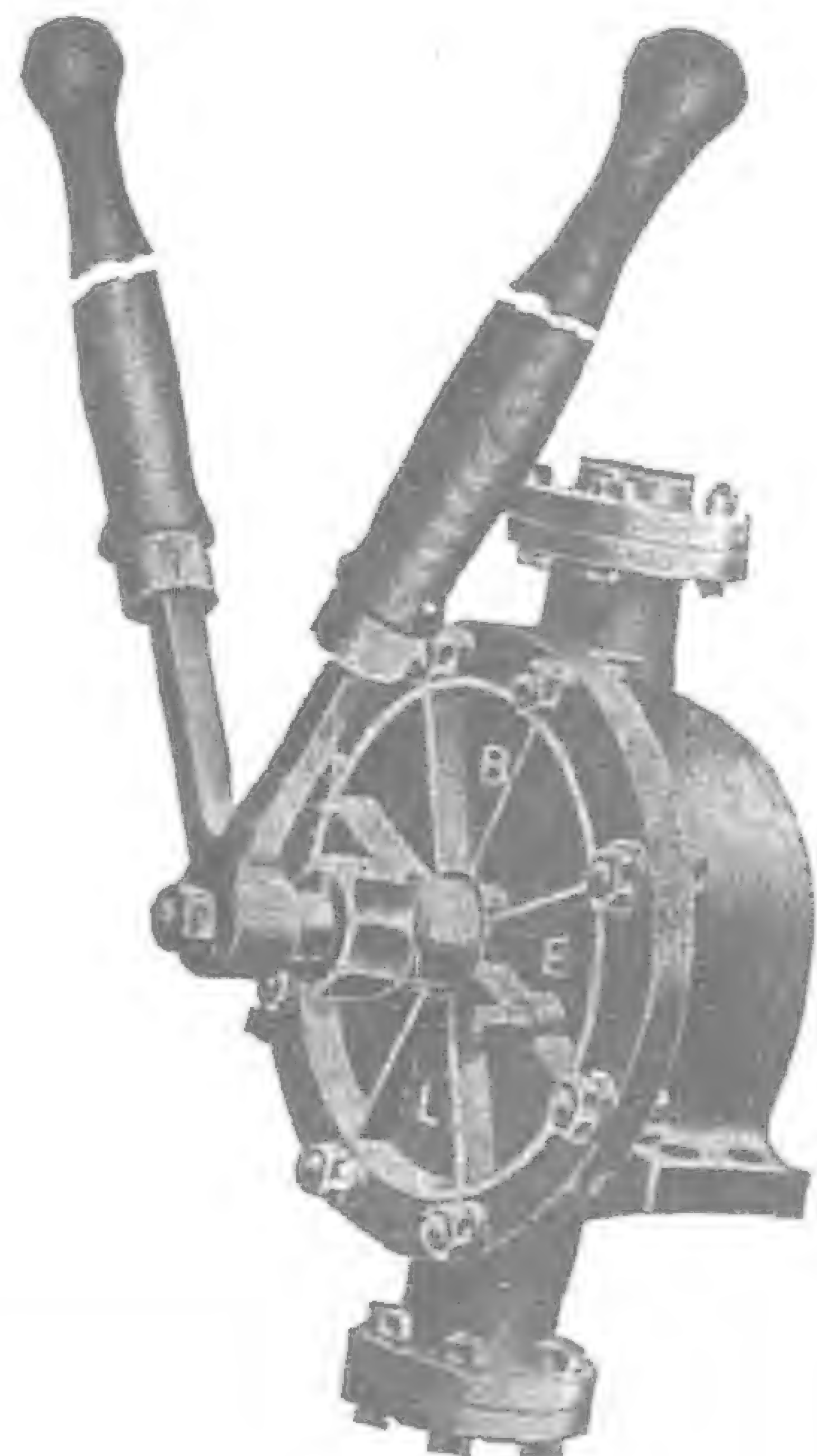
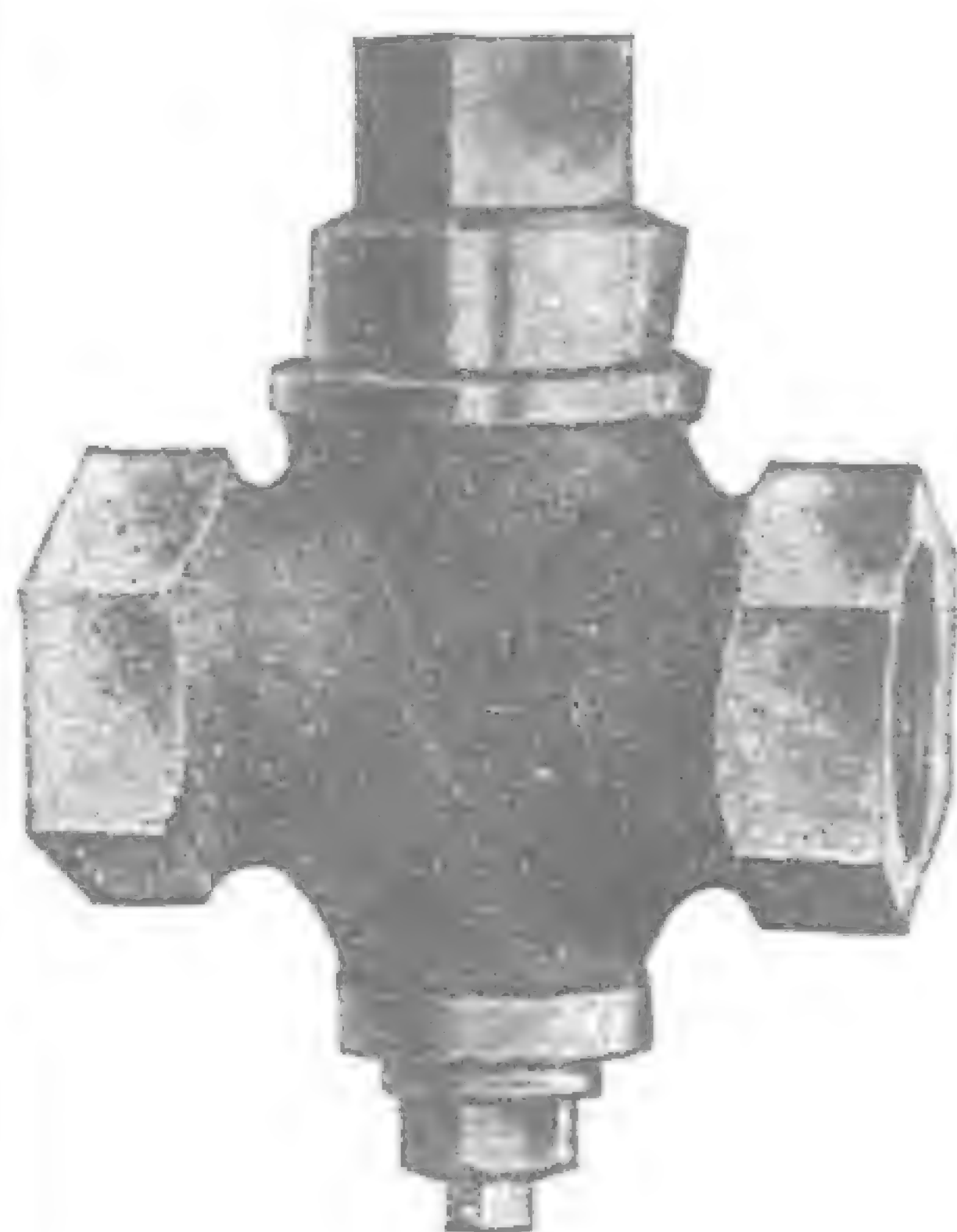
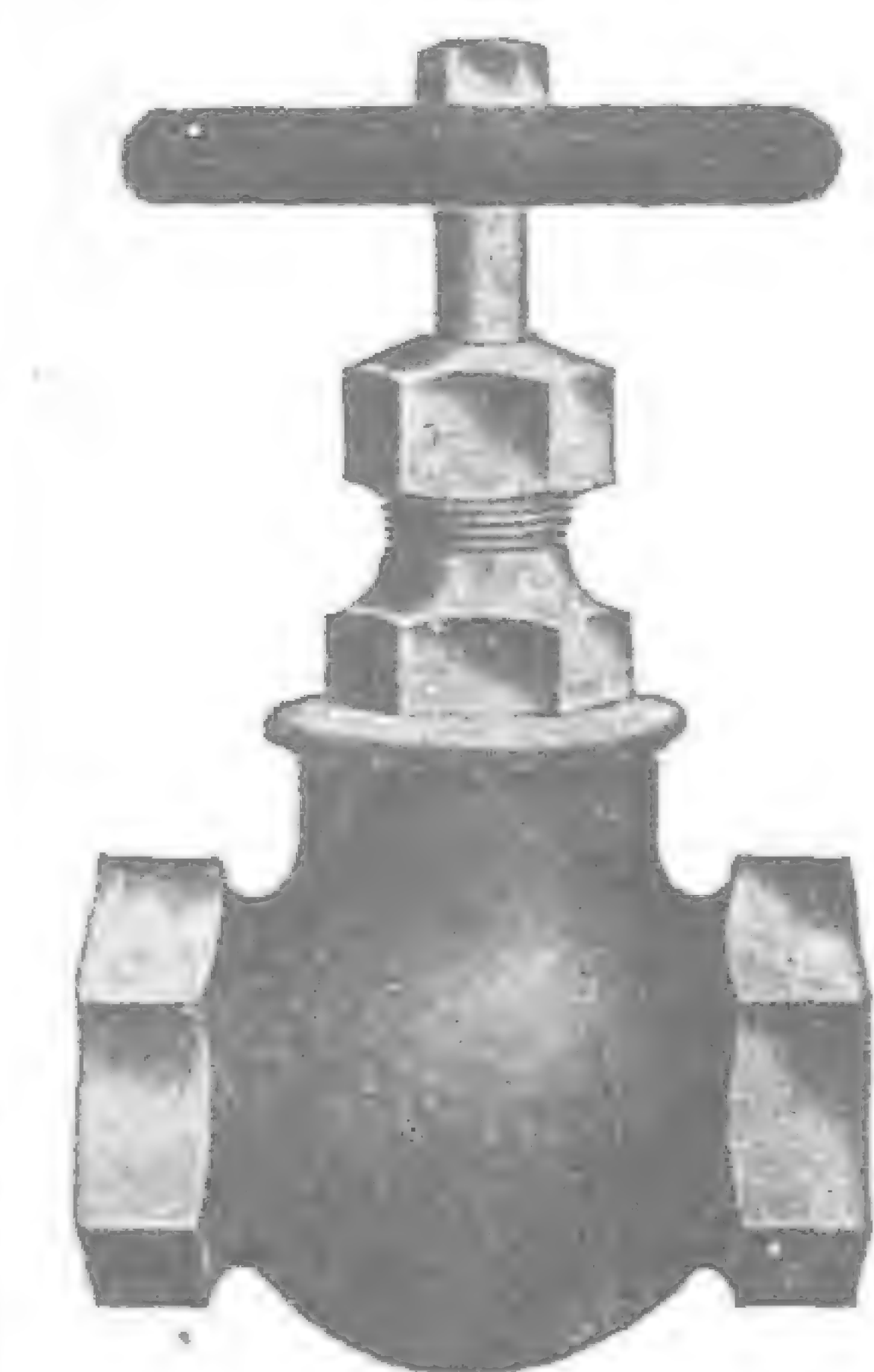
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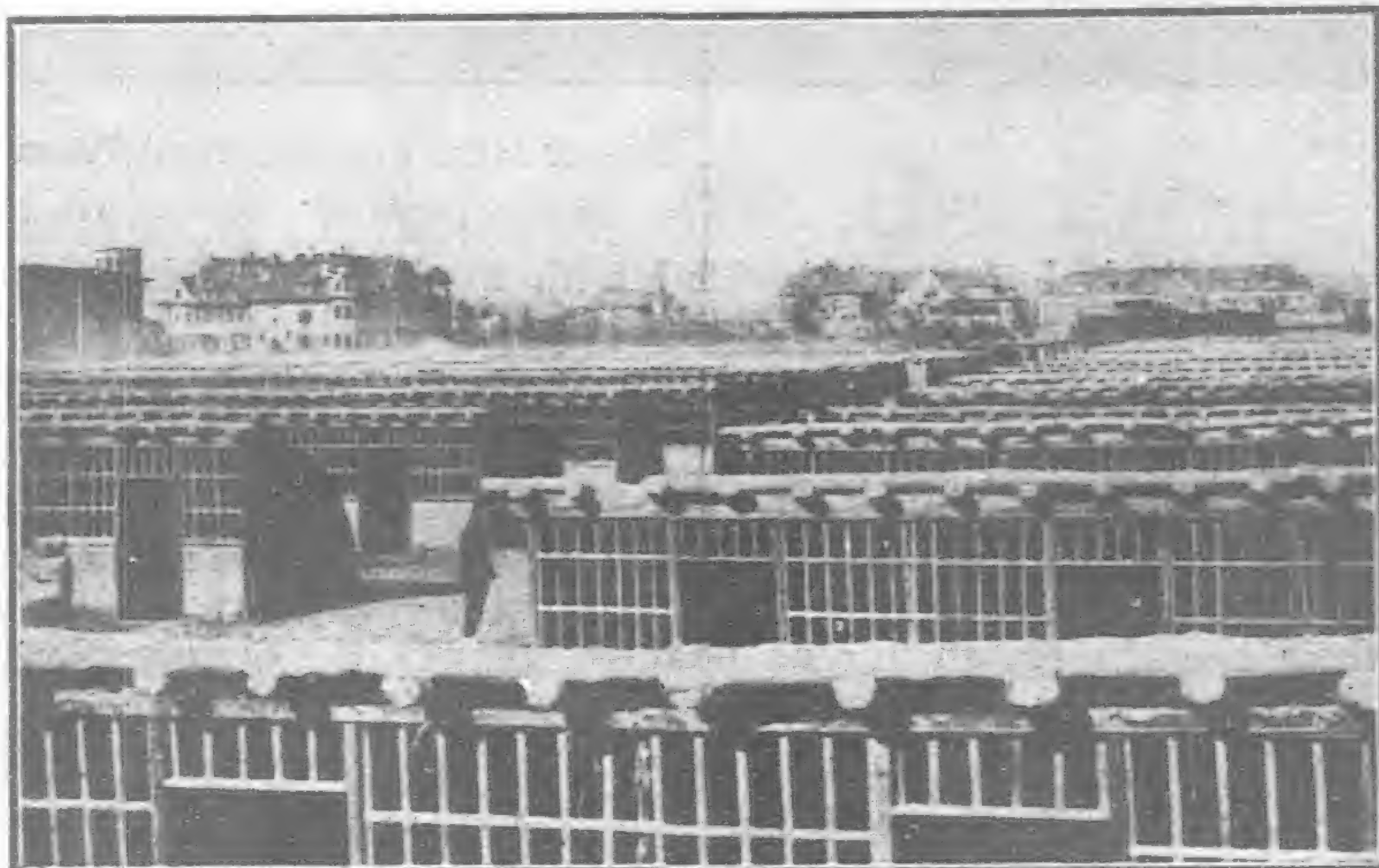
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No. 19



STREET OF HUTS BUILT FOR USE OF TIENTSIN FLOOD SUFFERERS AFTER PLANS OF MR. HARRY HUSSEY

Caring for the Tientsin Flood Sufferers

One of the largest problems calling for immediate attention as the result of the floods at Tientsin was that of caring for the great army of refugees who were forced into Tientsin from near and far by the flood waters. Foreigners quickly saw that terrible suffering would be inflicted on the helpless natives if prompt action was not taken to house and feed them during the cold weather. As the housing question was the chief one, it was given first consideration. Dr. Paul S. Reinsch, the American Minister at Peking, ever ready to render assistance to the suffering, telegraphed a statement of the prevailing conditions to America. As a result, the American Red Cross Society authorized him to spend up to \$50,000 (gold) for relief work, asking him to appoint a committee of nine persons to outline the policy and control the work. Mr. Roger Greene, of the China Medical Board, was asked to serve as special representative of the Red Cross, and others appointed were Colonel Edward Sigerfoos, Commanding the 15th Infantry at Tientsin; Mr. R. T. Evans, Professor in the Peiyang University; Mr. F. L. Belin, of the American Legation; Dr. N. S. Hopkins, of the Methodist Mission; Mr. R. R. Gaily, of the Y. M. C. A., Peking; Mr. R. S. Hall, of the Y. M. C. A., Tientsin; and Mr. L. O. McGowan, of the China American Trading Company, Tientsin.

This Committee held a meeting in Tientsin on October 19, and it was decided, in view of the near approach of the cold weather and the fact that there were then some 55,000 refugees in Tientsin (and more daily coming in) housed in mat sheds, Chinese theaters, guild houses, temples, and in the unenclosed galleries of public buildings, places that would be entirely

inadequate for their accommodation in cold weather, that the provision of shelter should first be grappled with. It was therefore decided to build 1,000 huts, of reeds and mud. A site was secured from the Chinese authorities in the former German concession, and arrangements were made with Mr. Harry Hussey,—of the well-known architectural firm of Shattuck and Hussey, of Chicago, and who is in charge of the erection of the huge building for the China Medical Board at Peking—to undertake the quick erection of the shelters. In designing the huts and arranging for their erection Mr. Hussey displayed a remarkable understanding of local conditions and the possibilities of organized Chinese labor; an understanding which was enhanced by the valuable assistance of Mr. R. A. White, of the firm of E. W. Frazar, who was actually in charge of the construction work. The combined leadership saw 800 huts completed within a few days. In addition to the huts a group of administrative buildings were erected, as well as buildings for the medical care of the refugees. The total appropriation for this service at that time was \$20,000 (silver). Mr. McGowan generously lent the use of some of his land and buildings, which were easily adapted for the dispensary and bath houses, and timber for the hut frames was supplied at specially low rates by the Robert Dollar Company and the China Import and Export Lumber Co.

The administration of this camp was placed in the capable hands of Colonel Sigerfoos, who appointed Captain Morrow to be the chief executive. Other army officers were detailed to assist him, particularly in the purchase and distribution of



HUSSEY HUTS FINISHED WITH PAPER WINDOWS ALL READY FOR OCCUPANCY

stores. Each hut was provided with a stove on which the refugees can do their own cooking.

To avert any possibility of infectious diseases taking hold of the camp, each person admitted is bathed, vaccinated, and supplied with clean clothing.

To minimize any aspect of charity, and to keep the refugees in good health, steps have been taken to enable them to earn their own living, so far as possible, though the organization will supply food for those who cannot support themselves.

This camp was utilized to house refugees living in extremely insanitary conditions in the various concessions. Other camps also sprang into existence to care for other refugees.

The Committee has also appropriated money for the investigation by representatives of the Protestant missions, of conditions in the interior, and it also took steps to arrange for the initiation of some actual constructive work on which refugees can be employed. For this purpose, Professor Bailey, of the University of Nanking, was invited to Peking, he having had large experience in the past in caring for refugees. One scheme proposed is to build certain roads, an excellent idea to which it is hoped the Central Government will give its entire support.

Mr. Hsung Shih-ling, who has been appointed by the Government to take charge of official relief measures, expressed a desire for the various charitable organizations to work together and to provide certain funds for the purpose. He invited the various organizations of Chinese gentry, Chinese Red Cross, police officials, Christian Relief Committees of Peking and Tientsin to coöperate; and at a meeting of representatives, the Metropolitan Union Flood Relief Council was organized under the chairmanship of Mr. Hsiung. The idea is that private contributions will be turned over to this Council, and that organizations already at work will make applications, which, if approved, will be complied with as far as possible. Official funds will also be provided, the Council to supplement the private contributions. Mr. S. E. Lucas and Mr. Feng-shu are the joint treasurers.

Work having thus been organized, speedy assistance and the effects of the freezing winter can be looked forward to with comfort so far as the Tientsin area is concerned. Regarding the other flooded districts, the *Peking Daily News* recently published a letter to the Metropolitan Flood Relief Council from a member of a committee who recently visited the flooded region of Chihli province, which gives a vivid

and impressive picture of the conditions, and stating that unless relief is effectively administered on a large scale, sickness, hunger and death will be the fate of tens of thousands of people before the winter is done, and the economic strength of the population as a whole be measurably weakened. To realize the desperateness of the situation, one must consider in detail the following facts:

The spring crop of wheat was very poor on account of the widespread drought, the sudden coming of the water on the ninth of the sixth month and protracted torrential rains tumbled down a very large proportion of the houses, which, in many of the sections we visited, are chiefly made of unbaked bricks, an indication of the poverty of the villagers even in the best of times. More serious, perhaps, than the loss of the houses themselves was the attendant destruction of much movable property, including clothing, and the ruining of even the limited supplies of grain stored in the houses that fell. Incomparably more serious than losses of the sort just described was the carrying away of all standing crops.

Over a considerable part of the flooded district the waters subsided quickly. Every one bought buckwheat seed, buckwheat being the one staple crop that was possible to harvest before winter. The supply of seed was naturally inadequate to meet the unexpected demand, and the price rose several hundred per cent. This was a drain on the financial resources of the community. In many places the expenditure was quite in vain, for a second flood carried away the crop. At very best only twenty-five or thirty per cent of the harvest hoped for was actually reaped, so that the relief afforded to the food shortage was very slight. In many of the grain-producing districts of North China the season has been a good one for autumn crops; and, if difficulties of transportation can be overcome, there is no reason why grain should not be sold at low prices throughout the flooded district till the spring wheat is harvested next summer. The crucial question is the purchasing power of the people. In a large part of the places visited there are no large holders of land, who could from accumulated wealth tide dependents or poorer neighbors over a time of exceptional calamity. The farmers are all small farmers who, in the best of times, barely get through the year with enough to eat, and never save any considerable amount of cash.

The letter closes with an appeal for funds, saying it would be a thousand pities if intelligent people, cursed by the lack of imagination and basing conclusions only upon the fact that no great number of people have yet starved, should leave millions of people to face hunger, cold, sickness, and death this winter with no effort to extend the aid of common humanity.



FILLING UNDER CONSTRUCTION FROM BARROWS AND CARTS. BAGS BEING PLACED ONLY ON SIDE AWAY FROM HOUSES



DIKE UNDER CONSTRUCTION IN SMALL GARDEN NEAR RACE COURSE ROAD SHOWS DOUBLE ROW OF BAGS

How the Water Was Pumped Out of the British Concession, Tientsin

[BY W. M. BERGIN, B.A., B.E., A.M.I.C.E., RESIDENT ENGINEER PEKING-MUKDEN RAILWAY, LAI HSUN]

On October 6 at a meeting of the Council, it was decided to carry out the recommendations of the Special Committee of Engineers to construct a dike round the old Concessions and pump out the water, and the estimated expenditure of Tls. 50,000 was sanctioned, the time required to complete the work in six weeks being considered reasonable.

Being Saturday, a little time was lost; but pumps were ordered from the Peking-Mukden Railway Engineering Shops at Shanghaiuan and arrangements were made with the Hai-ho Conservancy to use their huge motion dredger pump by turning the boat round and drawing through the discharge pipe.

Monday was spent in arranging with contractors, finding the best place to get the necessary filling, and purchasing gunny bags, etc., the final arrangements, which were all completed by Tuesday, October 9, when the contract was signed, were in brief:

Filling to be obtained about one mile down the river at the Salt Depot, in the first cutting, loaded into Hai-ho Conservancy barges, unloaded at two points on The Bund, filled into bags to form the sides of the dike or taken direct by cart or barrow to form the center of the dikes which were to be constructed, one

along Dickinson Road and the old Mud Wall, the other along Bristow Road between the French and the British Concession, both to meet at the British Municipal Concession. Pumping Station at the end of Bristow Road.

It was found that filling could be obtained from some of the recently filled ground not far from the mud wall on the other side of the creek. This greatly facilitated the work, permitting construction to be carried out from several points at the same time, as all the filled bags and mud from this place were carried in boats directly to the point required.

No time was really lost between the sanctioning of the work and the start, as this time was necessary to find the best location for the dike, measure the depths of water, and calculate the quantities of materials required at the various places.

The Bristow Road Dike was begun on October 11

The Dickinson " " " " " 12

The Mud Wall " " " " " 13

All completed..... " 20 at 6 P.M.

Pumping was begun immediately.



DIGGING MUD AT SALT DEPOT FOR FILLING DIKE



FILLING DIKE WITH MUD FROM BOATS

SCENES SHOWING PHASES OF UNWATERING TIENTSIN



FILLING BETWEEN BAG SIDES COMPLETED. INDIAN SOLDIER GUARDING DIKE TO KEEP OFF LOAFERS FROM DELAYING WORK



LAYING BAGS FROM BOATS LONG MUD WALL WHERE WALL IS JUST ABOVE FLOOD LEVEL. (WORKING TOO QUICK FOR THE CAMERA!)



NATIVE WATER BASKETS AT WORK ON DIKE ON MUD WALL. ELECTRIC LIGHT POWER HOUSE IN DISTANCE



PEKING-MUKDEN RAILWAY PUMPS. ROOF OF BRITISH MUNICIPAL CONCESSION 9" PUMP HOUSE SHOWS HALF OUT OF WATER IN MIDDLE LEFT. THIS HOUSE STANDS IN THE RESERVOIR



PEKING-MUKDEN RAILWAY BOILERS FOR 10" PUMPS JUST LOADED



PEKING-MUKDEN RAILWAY PUMPING PLANT SECTION

A few quantities may be of interest as showing the magnitude of the work:

Total length of dikes.....9,168 feet
Total quantity of filling.....2,416 fong
Total number of bags.....24,014 pcs.

This gives an average section 10'x3' over the bag sides. Where there was no danger of wave action near the walls the bags were omitted on that side. The bags were filled about $\frac{3}{4}$ full and laid lengthwise, lapping, a construction which was found very strong where any had to be removed after having once become consolidated.



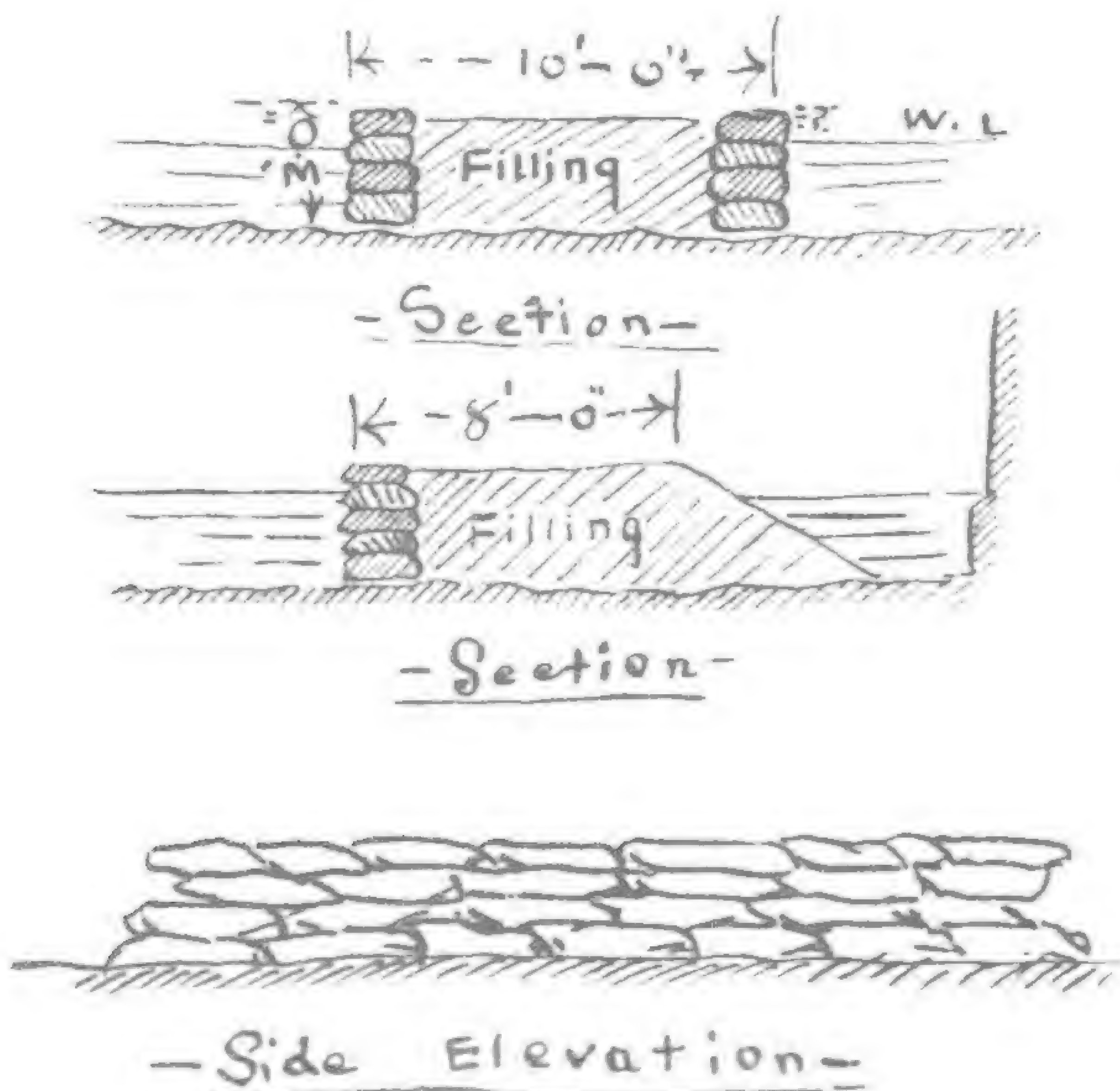
PEKING-MUKDEN RAILWAY. EIGHT PUMPS AT WORK 4'10" x 4'6" CENTRIFUGALS. BOILER HOUSE OF BRITISH MUNICIPAL CONCESSION. 15" PUMP IN DISTANCE



PEKING-MUKDEN RAILWAY PUMPS SECTION. FOUR NEAREST ARE 6"

Now we come to the water and getting it outside the dike. The quantity to be pumped out was variously estimated, but the following was very near the work. The flooded area consisted roughly of a right-angled triangle with sides 6,000' and 4,000', or an area of 12 million square feet; the depth was 2 feet to 3 feet on all except the lowest roads, so a drop of 2 feet 6 inches would clear nearly all. This gave 30 million cubic feet or 187½ million gallons (1 inches=6¼ million gallons)

The plant consisted of centrifugal pumps four 10 inches four 6 inches from the Peking-Mukden Railway; one 21 inches suction dredger; one 15 inches and one 9 inches British Municipal Concession; the 15 inches just under water and the 10 inches were 2 feet 10 inches below the surface. Also 500 coolies were employed the first 2 days in double shifts working 250 native water baskets.



Capacity of Pumps

10"	4	X	1,650)	Gallons per min.	Gallons per day
6"	4	X	600)	9,000	or nearly 13 millions
15"	1	X	4,000	4,000	5¾ "
* 21"	1	X	5,000	5,000	7¼ "
Baskets	250	X	20	5,000	7¼ "
Total Capacity				33¼	"

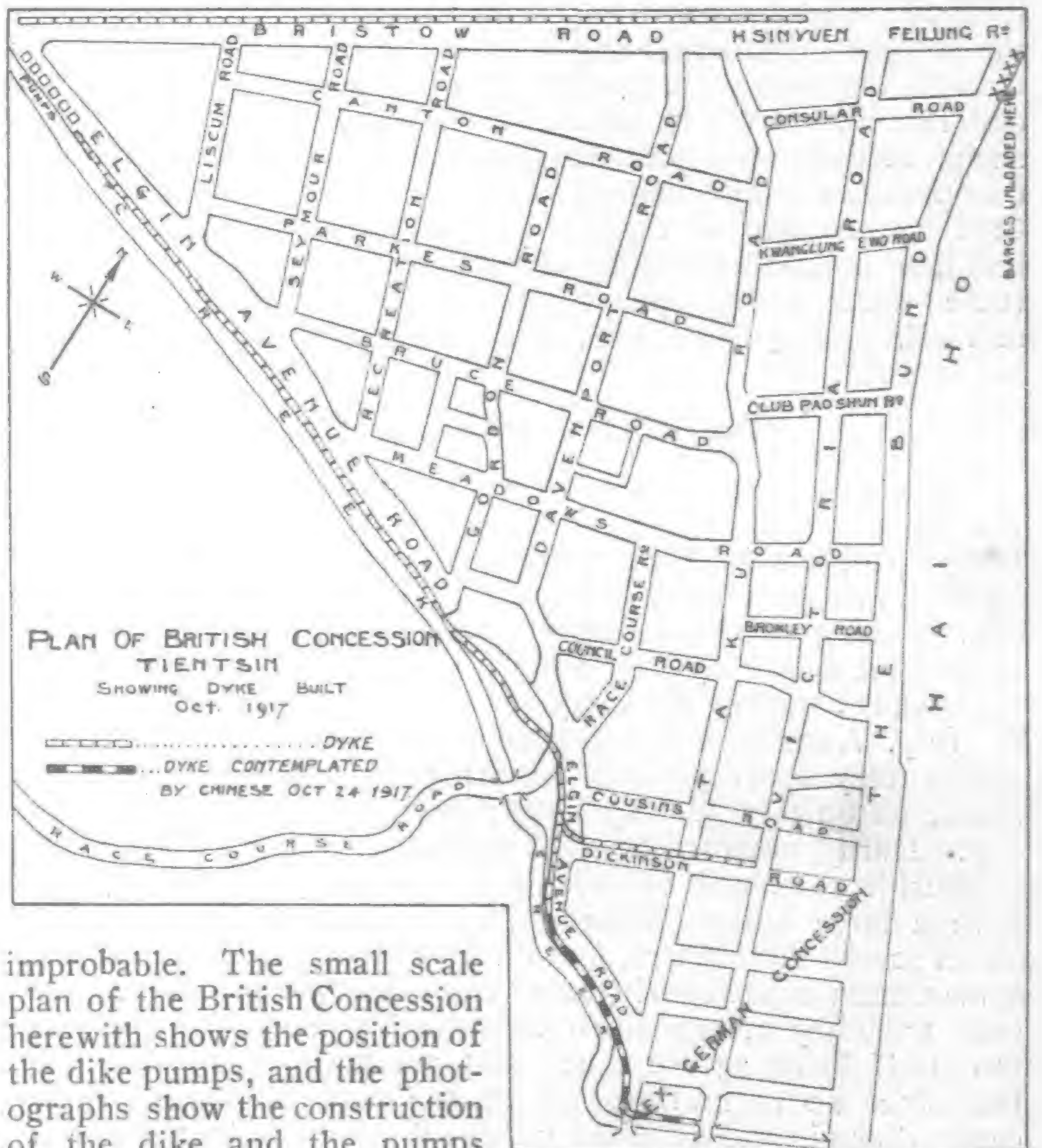
(*This pump was working through the long discharge very much under its full capacity of about 8,000 cubic feet per minute).

How the Water Went Down

Pumping was started at 6 P.M. on October 20 and the water was down nearly five inches by the following night. On the 22nd., it was down eleven inches and although water was

admitted from the ex-German concession next day, the level was 17 inches lower. Two feet 11 inches was the record on the 25th and most roads were clear. On the 27th, all roads were clear and the water was down five feet, nine inches. On the 29th ten feet of water had been pumped.

The eight Peking-Mukden Railway pumps arrived at Tientsin on October 14, and were all ready and on trial run by midday on October 20, which speaks very well for those directly in charge of this part of the work. Two of the Peking-Mukden Railway 10 inch pumps have been left ready in case of a bad leak developing, or a break occurring in the drain, though either is extremely



improbable. The small scale plan of the British Concession herewith shows the position of the dike pumps, and the photographs show the construction of the dike and the pumps quite clearly.

While it can be safely said that every one connected with the work of getting the waters out of the British Concession, Tientsin, worked well, there is not the slightest doubt that the chief credit must be given to the Chairman of the Special Engineering Committee, Mr. C. S. Knowles, who first showed that the work was possible when others seemed hopeless, and whose extraordinary organizing and business ability got the work done in the minimum time and at a very low cost, both about half what were considered reasonable estimates.

Chihli Province River Conservance

[BY H. VAN DER VEEN, C. E. CONSULTING ENGINEER TO THE NATIONAL CONSERVANCY BUREAU]

The province of Chihli comprises a large part of the Great Plain of China through which run the rivers that drain the mountain country in the west and northwest.

In prehistoric times this plain was a sea, of which the bottom was raised partly by the silt brought down by various rivers, and partly by diastrophic movements, until it became what it is at present.

That these alterations must have affected the rivers is evident, because, instead of being able by the greater velocity of current that they had before their slope was lengthened to carry all the silt down to the sea, they were now obliged to drop it on the way and thus commenced the building of the plain in an effort to establish a uniform slope from their source to the sea, and to reach that stage of equilibrium in which a river is simply a drain of the country through which it runs.

This process of uniform gradient building has, however, not always gone on without interruption, for on several occasions in the course of centuries the Yellow River has visited these districts and has disturbed much of the work already accomplished. Moreover, as the mountains in which these rivers take their rise are of a typical geological formation, being covered with easily erodible material, aerial deposits dating from earlier geological periods—the same material also filling the valleys, the river water brings down extraordinary quantities of silt, so the process of plain building is in this instance far more marked than in the case of any other river in the world. Yet, if man had not interfered so much, or rather, had not interfered in such a reckless and ignorant way, the inundations that now visit this province would neither have been so disastrous, nor have been so frequent in their occurrence; for although this plain-building is carried out by inundations the process is, even in these water ways, notwithstanding its being extraordinarily marked, a very slow one, and would never have resulted in catastrophes like the one recorded this year.

Five Rivers with One Outlet

The five most important waterways in this province are the Pei-yen Ho, the Yung-ting Ho, the Ta-ching Ho, the Dze-ya Ho, and the Yu Ho, draining together a basin of 70,000 square miles, of which about 50,000 square miles are mountainous. Owing to the climatic conditions in these regions, the rivers give only very little water during the greater part of the year whilst, during the rainy season, that is, during the months of July, August, and September, heavy rainfalls may recur within very short periods, resulting in sudden freshets which recede as quickly as they come, leaving the river again almost dry. During such freshets the volume of water brought down is considerable, and to cope with it properly each river should have a large outlet. There is, as a matter of fact, only one outlet for all these rivers, *i.e.*, the Hai Ho. This river has only a maximum capacity of 30,000 cubic feet per second, whereas each tributary brings down considerably more, the Yung-ting Ho itself bringing six times that amount. It is thus evident that since no natural storage basin exists, all the water that comes down in excess of the volume disposed of by the Hai Ho has to go elsewhere and finds no alternative but to leave its bed and overflow the country on every side. Every year such inundations take place, usually only along one or two of the tributaries but sometimes, by unfortunate chance, as for example this year, along all the rivers at the same time.

Disastrous as such inundations are, especially when they are caused by the breaking of dikes along the upper reaches, the consequences are still more serious when we consider the enormous amount of silt carried down by the water, thus accelerating the silting of the river bed immediately below the

break and rendering the river even more incapable of coping with the extra volume of water brought down by new freshets. The water, heavily laden with silt and needing a strong current to carry it down, is already hampered by an insufficient slope and consequently any further flattening causes an inadequate outlet, and the consequences thereof, *i.e.*, dike breaks, quickly tend to make the silt evil more acute than is necessitated by the original causes.

Under the present circumstances inundations are bound to occur regularly, and since they are only the natural results of existing conditions they can hardly be called accidents.

Although this most deplorable state of affairs is only the natural consequence of the existing conditions, this does not at all imply that the causes which brought about those conditions are natural. Neither the extraordinary quantity of silt nor the inadequate outlet are natural but, on the contrary, are both due to the unskillful and at the same time reckless interference of man.

The Silt Evil

As explained already in the beginning of this article, the geological features of the mountains account for the rivers in this province bringing down more silt than other rivers. Yet if the hills had not been deforested, the water would only have been able to carry out its process of erosion in the valleys until they arrived at some lower and older strata, better able to withstand the scouring effect.

But as the people on the hills wanted land for cultivation and those on the plains increased and needed more timber or wood for fuel, the forest that once covered the hills became thinner and thinner, until at the present time practically no trace of it is left, and the unprotected soil is exposed on the mercy of the rainfall. Thus, during the torrential rains that occasionally occur in the rainy season, the water, rushing down the hillsides unhindered by vegetation or roots of plants and trees, and gaining in velocity and power, carries with it such an enormous amount of silt that when the mountain streams arrive at the river below they resemble liquid mud rather than water. This is, however, not the only bad effect of deforestation; for, if the hills had been covered with forest a great part of the precipitation would have been absorbed by the trees or retained by the roots and in the soil, and not only would the amount eventually reaching the river have been less, but it would also have come down gradually and slowly over a longer period, and not, as is the case with most torrents, a few hours after the actual rainfall.

Inadequacy of Outlets

This, again, is due to human interference. As I have already pointed out, the only outlet for the entire catchment basin, except for a few overflows at present in very bad working order, is the Hai Ho. The Hai Ho has not always been the sole outlet. The chief reason why the drainage of the country has been rendered so imperfect is that the transportation of tribute rice to the Capital was thought of such vital importance that a waterway was made connecting Peking with the rich country in the south; and as the Grand Canal was constructed without due appreciation of the importance of free and unhindered courses for the various rivers that had to be crossed, or, if the appreciation existed then at least without sufficient hydraulic knowledge to provide adequate other means for offsetting any obstruction caused, the entire drainage system has been upset.

Before the Canal was constructed the Hai Ho served, as far as I can ascertain, only as the outlet of the Pei Ho, the

Yung-ting Ho, and the Taching Ho; the Dze Ya Ho and the Wei Ho had outlets direct to the sea farther to the south; but in the thirteenth century the construction of the Canal was commenced, and brought about great changes. So far as was possible river courses were followed, as for instance, the North Grand Canal from Tungchow to Tientsin is simply the Pei Ho. South of Tientsin the Canal was constructed by connecting the Pei Ho with the Dze Ya Ho and this again with the Wei Ho, following the course of the two last named rivers as far as possible, without deviating much from the general southerly direction of the Canal. This of itself would not have done much harm, but instead of letting the Dze Ya Ho and the Wei Ho retain their outlets to the sea, the former was entirely diverted and connected with the Taching Ho; whilst the Wei Ho was forced to follow the Canal as far as Tientsin, so that the Hai Ho had from that moment to cope with the flood waters of all the rivers. Certainly a few outlets were made to deal with the freshets in the Wei Ho, but as the Canal was constructed only for purposes of navigation and not with any consideration for drainage or other hydrographic requirements, its dimensions were far below the capacity required to deal with freshets effectively, so that generally the Canal banks had already burst before flood escapes could give sufficient relief. At present these flood escapes are hardly traceable, but I doubt very much whether they ever have been of much use.

Again, the Pei Ho had to suffer for being chosen as Grand Canal route, because, as it was necessary to have sufficient water for navigation in the dry season as well as in the rainy season, and as the Pei Ho did not supply enough, the deficit had to be supplied by some means and this was done by adding another river to the Pei Ho catchment area. The river thus diverted is the Chao Ho, originally belonging to the catchment basin of the Pei Tang Ho. It is evident that the adoption of this measure must have greatly affected the Pei Ho, for now this river had to carry, during the rainy season, not only its own freshets but those of the Chao Ho as well, besides adding another burden to the already overcharged Hai Ho.

Another river that has been sacrificed for the benefit of the Grand Canal is the Yung-ting Ho, or, as it was formerly called, the Hun Ho. In this case there was, however, some excuse, because the Hun Ho, on account of its short course from the mountains to the sea, brought down more silt than any other river, and would undoubtedly have spoiled the Grand Canal had it been allowed to follow its course unhindered. In order to prevent such a result, the river was led to the then existing swamps, which acted as storage basins, most of the silt being deposited in them, until in the course of centuries they became filled up, so that at present no more land is available for such purposes. But not only did the basins become filled up but the river bed also got raised on account of the restricted outflow of water, to an extent entirely out of proportion to the natural tendency. The result is that the Hun Ho is now a menace to the entire country and in destructive capacity is only surpassed by the Yellow River.

Moreover, the waterway from Tientsin, China's most important northern port, to the sea is in constant danger of being filled with the deposits accumulated in the bed of the Hai Po.

Methods of Improvement

The methods of improvement dictated by the facts detailed above obviously are:

- 1.—Re-afforestation.
- 2.—The provision of better outlets.

I have mentioned re-afforestation first, even though better outlets would give immediate relief, because an improvement of the rivers only would be but temporary in its effect. In order to make the effect a lasting one, the silt evil must be radically cured, and this can only be done effectually by re-afforestation. And as I have already explained, not only will the erosion on the hillsides be stopped by re-afforestation but the waters will rush down less impetuously. At the same time the roots of the trees and the earth between them will act as a natural reservoir, where a considerable amount of water will be stored up so that

the freshets will not be so strong, and a long time after the rainy season is over the water from this reservoir will continue to feed the river at a time when it would otherwise receive no water at all, or only a very little.

Better Outlets

As the Hai Ho is too small, and as the local conditions in Tientsin do not permit of an increase in the capacity of the river so as to make it an adequate outlet for a catchment basin of 70,000 square miles, it is necessary to provide other outlets; but even had the enlargement of the Hai Ho been feasible this plan could never serve the purpose in view so well as would entirely new outlets, for the following reasons. In the first place all the rivers are, throughout their lower course, that is, for a considerable distance above Tientsin, in a very bad condition, so that in order to make the enlargement of the Hai Ho effective it would be necessary to improve all these lower courses; and even were this practicable it would involve an enormous expenditure. Moreover, the influence of the Yung-ting Ho, and especially of the silt evil, would be so marked that before the good effect of re-afforestation would be noticeably produced, the Hai Ho would again be reduced to a considerable extent by the raising of its bed by Yung-ting Ho silt, and at the same time Tientsin would have ceased to be a port of any importance on account of the lack of a navigable route to the sea. Again, for the rivers Dze-ya Ho and Wei, the natural course to the sea is not by way of Tientsin, but much farther to the south, because the plain does not incline in a northerly direction but in a northeasterly one.

The only river that will continue to send all its waters down to the sea by way of the Hai Ho is the Ta Ching Ho. As it is, however, in the interest of the port of Tientsin to have as much fresh water supply as possible, the new outlets of the Wei and Dze-Ya Ho should be only used during the time of freshets, which can be easily arranged by constructing movable weirs at their entrance. In this way it is possible to lead, during the dry season, all the available water supply to Tientsin, whereas during floods the weirs can be entirely opened, thus giving the water a direct and easy escape to the sea. On account of the enormous percentage of silt which the Hun Ho brings down, this river should be permanently diverted. Unluckily this prevents making use of the fresh water supply of the Pei Ho so that the Hai Ho will receive anyhow less water than before. But this loss can be compensated by increasing the tidal action. By making the so often advocated Cathedral cutting, the tide will be felt so much farther up the river that the loss of upper water will not be felt at all. Also in order to facilitate the outflow of the Ta-Ching Ho this cutting is necessary, for although this river has large storage reservoirs in its catchment basin, the volume of water brought down when all its tributaries are in flood is considerable and requires a larger outlet than this most obstructive bend permits.

Conclusion

I have dealt in the foregoing pages with the causes of the frequent floods in this province, and have endeavored to explain *in extenso* the reason why these causes are so serious and also how by re-afforestation and a provision of better outlets the evil can be removed.

Owing to the entire lack of data and even of a good survey, it is impossible at present to draw up a detailed project.

The first step towards an improvement should therefore be a survey and extensive leveling, so that an accurate map can be made showing the contour lines of the country. At the same time, tide gauges should be placed along the various rivers and records kept of the readings that are taken. When this has been done, and adequate data have been collected, a plan can be drawn up and an estimate made. The amount of money required for the scheme once being known, means can be devised for procuring the necessary funds. In my opinion the cost could be easily defrayed out of surtaxes imposed on those lands that will be benefited by improvement arising from the adoption of remedial measures. The total expenditure involved cannot yet be foretold, but however high it may be the interests

at stake are so many, and the benefit to be derived is so enormous, that the initial outlay is only of secondary importance. Apart from the influence which improvement will have on the development of subsequent trade, it will at once put a stop to the inundations that cause yearly losses of several millions, and this year alone probably two hundred millions of dollars. When all this is taken into consideration, it is quite clear that the work cannot be commenced too soon, and whether or not the people in this province are in a financial position at

the present moment to render any monetary aid to the Government should not be taken into consideration. It is an absolute necessity from a national point of view that these conservancy improvements be carried out, and the saving to the Government by not having to exempt the people from paying taxes, and the profits that will eventually find their way to the National Exchequer through the taxation of the more prosperous country, warrant beyond a shadow of a doubt the above suggestions being carried into effect.

River Conservancy in Northern Anhwei

[By MR. J. LOSSING BUCK, AGRICULTURIST, NANHSUCHOW]

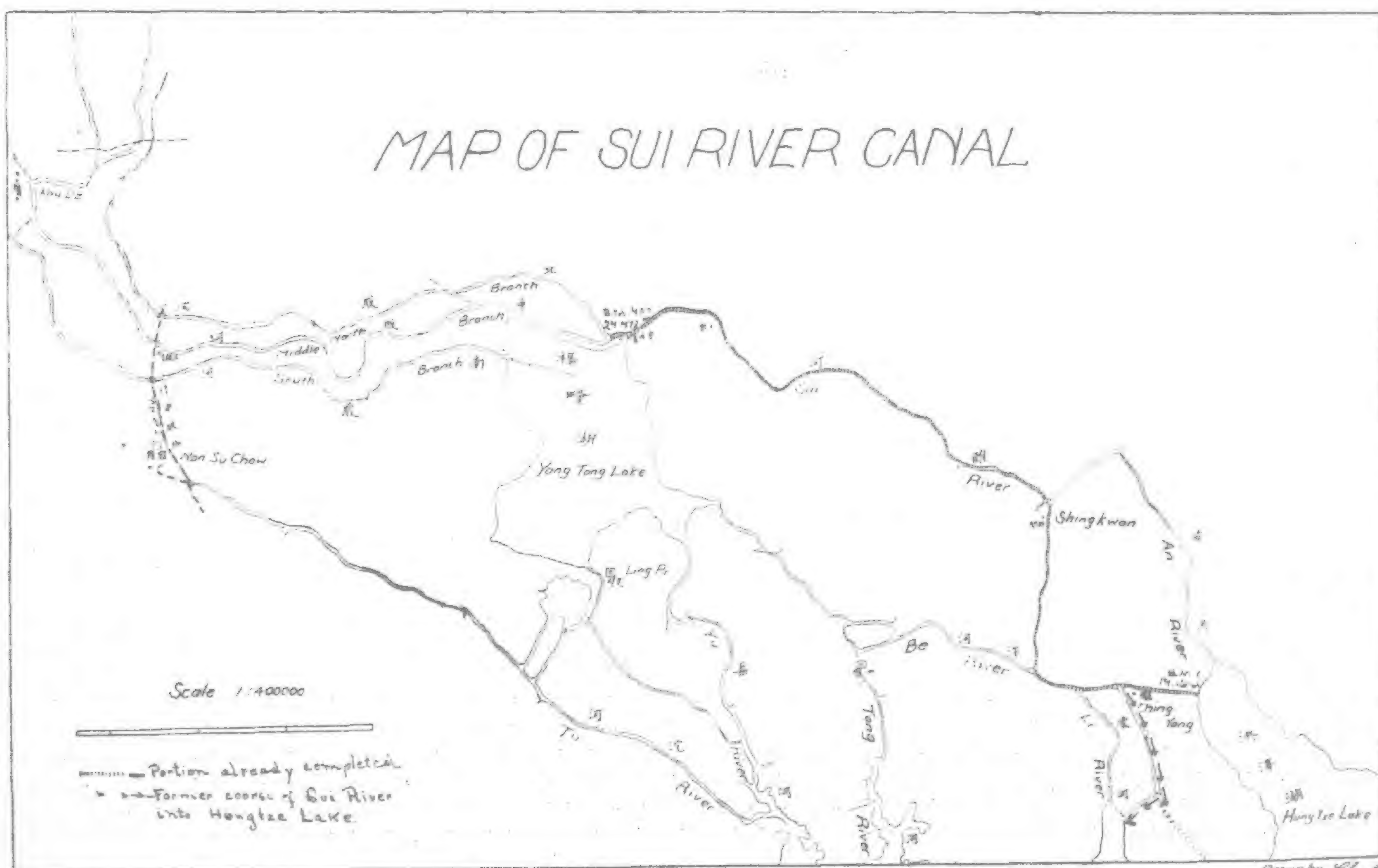
River conservancy was started in northern Anhwei in the autumn of 1915, and for some reason has not received the attention it deserves. The reason for starting such a project, the way it is being carried out, the results likely to be obtained, and the significance of the whole work is worthy of notice.

This work was started and is being carried on by Ni Shi Chung, the governor of Anhwei. It appears that he prefers to carry on the conservancy work of his own province, rather than have it done by the Hwai River Conservancy engineers. Governor Ni has evidently realized the great need of ameliorating the flood conditions of Anhwei, and has taken upon himself the responsibility of this problem. Part of the work he is doing is included in the Hwai River Project of the American Red Cross Society. However, the waters of the rivers concerned eventually reach the Hungtze Lake, and in this way, the two conservancies link up with each other.

Work is now being done on the Sui River Channel. The two hundred li, about 66 miles, from the Yang Tong Lake, north of Lingpi, to the Hungtze Lake, have already been completed.

From the Yang Tong Lake to the source of the Sui River, the river divides into three branches, the Middle Branch of which is to be dug this winter. The Southern Branch will be surveyed this winter, and work will be commenced on it as soon as the Middle Branch is finished. The Middle Branch will be dug out as far as Kou Dz, two hundred li from the Yang Tong Lake. The other rivers to be surveyed and dug out later are the Hui and the Fei rivers.

The cost of this Conservancy is being met by the three "hsiens," or counties, of Nansuchow, Lingpi, and Szechow, these being the districts more or less affected by the work. The Central Government pays for the surveying and management by means of an additional tax to that regularly paid by these counties. The total cost of the whole river conservancy is estimated at about two million dollars, three hundred thousand of which is already being used for the Sui River work. The labor is being provided by these three counties in addition to the increased tax. One of the section engineers says that about 300,000 laborers were employed last winter.





A PORTION OF ONE GANG OF A THOUSAND LABORERS. NOTE LABORERS' HUTS ALONG THE BANK



METHOD OF CARRYING EARTH. THESE TWO LABORERS HAVE JUST EMPTIED THEIR BASKET AND ARE GOING BACK AFTER ANOTHER

Each county is supposed to take charge of its share of the digging, and in this case of the Sui River, to each is assigned a given portion of the river. The magistrate of the city of Szechou is in charge of the Szechou share, and the magistrate of the city of Nanhsohou is in charge of the Lingpi and Nanhsohou share of the work. The methods of securing the laborers and digging out the bed of the river are left largely in the hands of these two magistrates, and each applies his own method to his own district. In the Nanhsohou and Lingpi districts, every landowner has to send one laborer for every three taels of regular tax paid on his land. If the landowner does not care to send a man, he has to pay between five and six dollars for every three taels of tax. This sum is supposed to pay for the food and housing of one laborer. In Szechou district, for every one hundred families, twenty-five laborers must be sent. These laborers must furnish their own food and shelter, as well as tools for digging. The other two counties furnish the tools for the laborers. All tools used are hand tools, and in the case of Szechou, are anything that the farmer himself happens to have. Those mostly used are wooden shovels, small iron shovels, two pronged hooks, some picks and baskets for carrying dirt. Swinging baskets for dipping out water and foot irrigation pumps are furnished to the men. The tools in the Nanhsohou and Lingpi districts are furnished to the laborers, and hence are better standardized than those of the other section. The digging tools in these sections of Nanhsohou and Lingpi are picks and shovels, the other tools similar to those of Szechou, but with the addition of two oil engine pumps. Digging is at the rate of one fong a day for three men. For every fong completed the Nanhsohou and Lingpi districts gives the three laborers two coppers and two catties of rice in addition to the regular food and housing allowance.

The work at the river itself is divided into sections of eighty li, and each division has a section engineer. These engineers are

in charge of the 10,000 laborers who are assigned to each section. There is a manager to every 1,000 laborers, and these groups of 1,000 are further divided into smaller divisions, the smallest being gangs of ten men, with a foreman to each gang. Careful surveys have been made by the engineers, all of whom are Chinese. They have made the gradient of the channel already finished six to twelve one hundredths of a Chinese foot per half li. Most of the head officers of the Conservancy hold their offices in a political sense, and not because of any technical knowledge of conservancy engineering. Even the chief engineer only holds his office as a political one. However, the actual work is evidently being done by men of the required technical knowledge, most of them having been trained in the various engineering schools of this country.

Two hundred li of river bed dredged out in a year and a half by hand by the local population of the three counties concerned is a feat worthy of notice. The new channel is now ten to thirty feet deep, forty to eighty feet wide at the bottom, and eighty to two hundred feet across from bank to bank. It is reported by one of the section engineers, that three fourths of the Yang Tong Lake had no water in it this past summer, due to the digging of this channel. This report is confirmed by the farmers of the region concerned, who say that the lake is much lower than usual. It is also stated by the farmers of the Szechow district, that the reason for no high water there was due largely to the digging of this channel. It is estimated that 220,000 mow of land formerly in the Yang Tong Lake can now be reclaimed.

This new Sui River Channel, and the other ones to be dug, will undoubtedly help to relieve the flood conditions of northern Anhwei. The part which has already been finished is included in the Huai River Conservancy Project. The work still contemplated is exactly what should be done to make the Huai River Conservancy Project more effective. The object of the Huai River



TYPICAL SCENE ON THE WORK



A SWINGING BASKET USED FOR "PUMPING"



SHOWING A FINISHED PORTION OF THE NEW CHANNEL BETWEEN CHINGYANG AND THE HUNGZE LAKE



ONE OF THE HUTS SHOWN IN DETAIL. ALL ARE MADE OF MATTING. COOKING STOVES ARE IN FRONT OF HUTS

Project is to empty the Hungtze Lake, and, until this is accomplished, the dredging of the rivers emptying into it cannot be a complete success. Neither can the completion of the larger Conservancy Project of the Huai River produce the best results until the old river beds and new channels and canals are dug, to connect up with this larger scheme. The two conservancies go hand in hand, and if both are willing to coöperate, great good can be accomplished.

This new Sui River Channel undertaking is significant, in that it shows what can be done in China if the local officials and the central government would but get together and start such public improvements as conservancy work. A larger labor force was kept at work during the winter than during the summer, for the reason that a great many of the farmers and coolies are idle during the winter months. The majority of the farmers of northern Anhwei, and this is undoubtedly true in many other parts of China, spend their winters in idleness and gambling. Nothing could be better for them and their country than for them to work during the winter months on some public project, such as conservancy, or road building, or even some local drainage problem of their own. It seems that this idea of forced labor for some public good, during the winter months, is well worth further consideration. Of course, forced labor can be made to work a great hardship on the people, but, on the other hand, it can accomplish a great deal of good for the people themselves, as well as for their country.

One has but to see, as the writer did last year, thousands of these farmers at work digging out the river bed to realize what a tremendous latent power there is in hand labor in China. If the provincial and central government authorities would only use this reserve labor force in the right way, a great many public improvements could easily be made. If some very local public improvement could be made first, to be followed by larger public improvements, the value of which is not easily discerned

by the ignorant farmer, there would be more willingness and a better feeling among those participating in the work. However, as in the case of river conservancy, it is usually the big undertakings that have to be started first. Real, effective conservancy work should reach the individual farmer so that even his own little piece of land may be drained. This, of course, would lead to the coöperation so much needed between the provincial and central governments and the individual farmer. So long as needed public improvements are left to the farmer, they can never be brought about. It is the business of the provincial and central governments to make these improvements, and until this is done, the governments have failed of their whole duty. It is to be hoped that this conservancy work in Northern Anhwei will lead other provinces to carry out similar undertakings.



A GANG OF 1,000, WHICH STOPPED WORK TO SEE A FOREIGNER AND HIS BICYCLE

PHILIPPINE FOREIGN TRADE

Both Philippine imports and exports, despite war conditions, continue on the increase, as is evidenced by a statement of the foreign commerce of the Islands prepared by the collector of customs, comparing the totals and values of the various articles for September, 1917, with those of the same month of this year. There is a noteworthy increase of imports—from a value of P. 7,112,759 in September of last year to P. 14,075,786 in September, 1917. Duties collected on imports exceeded those of last September by over P. 100,000. Principal among the increases in importation are those of cotton, iron and steel, wheat flour, automobiles, coal, vegetable fibers, fish and products, wool and manufactures of wool, meat, silk, and illuminating oil.

Articles exported from the Philippines during September of last year were valued at P. 12,106,064, compared with P. 20,606,559—an increase of almost eight million pesos. The list is headed by hemp, showing an increase of nearly five million kilos, in quantity and of approximately six million pesos in money value. The United States heads the list of the value of imports and exports from and to the various countries of the world, the total trade carried on with the home country during September 17, having amounted to P. 24,893,610. Japan, the United Kingdom, French East Indies, China, and Hongkong, follow in the order named. Vessels flying the Japanese flag brought to the Islands merchandise valued at P. 3,197,909; Norwegian vessels, P. 2,249,409; British, P. 1,52,652; and American P. 1,323,966.

The bulk of exports was handled by American bottoms, with Japanese second and British third.

China and Germany's After-the-War Trade Efforts

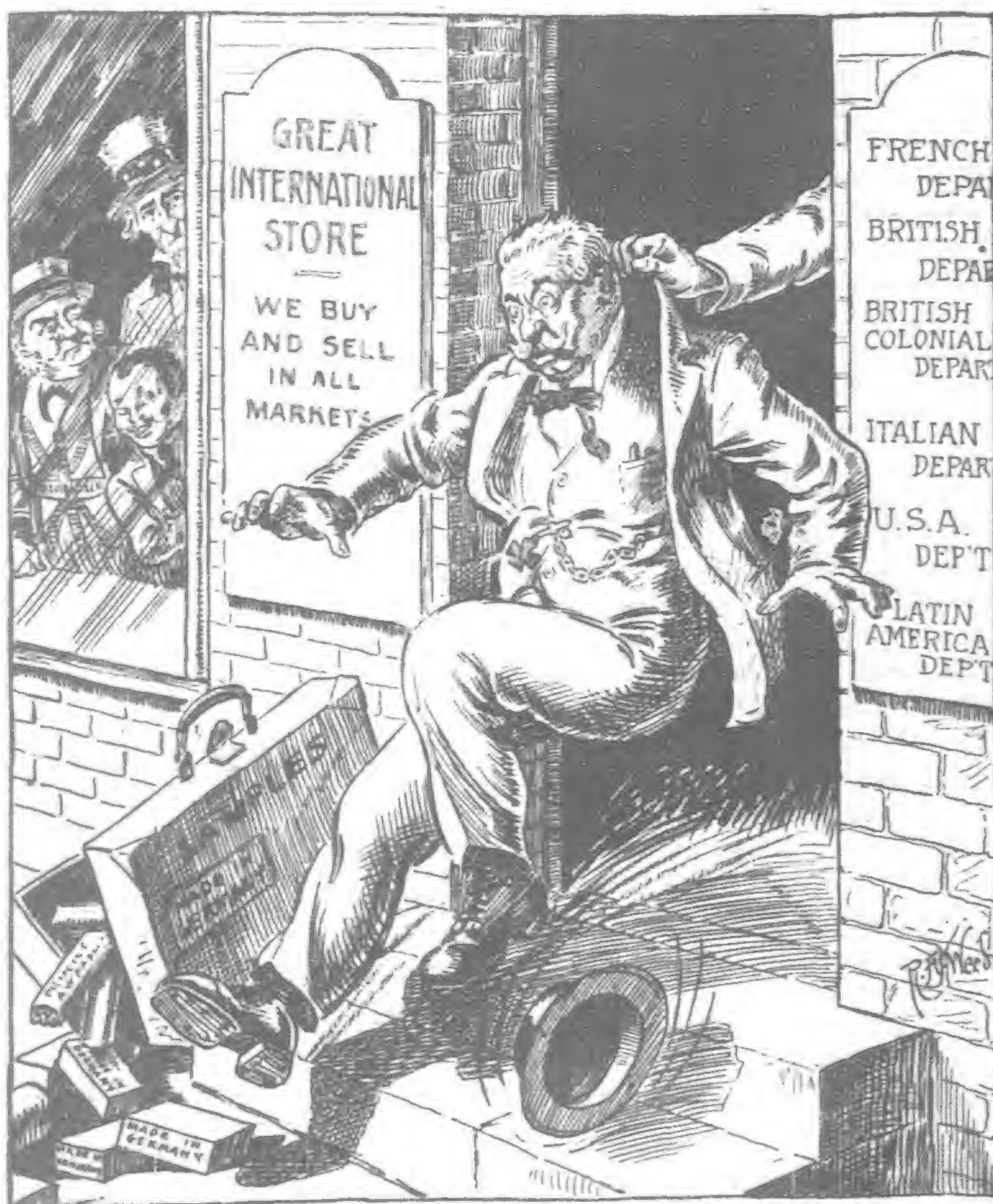
The Chinese Minister of Finance Declares in Favor of Penalizing Germany for Her Atrocities by Inaugurating After-the-War Trade Restrictions

Mr. Liang Chi-chiao, the Chinese Minister of Finance, made a significant speech at the banquet given by the Anglo-Chinese Friendship Bureau as a welcome to Sir John Jordan, the British Minister at Peking, on his return to China from furlough in England. In referring to China's entry into the war Mr. Liang laid it down that China must coöperate with the Allies not only to defeat the Central Powers in the war, but also, at the conclusion of the war, to drive Germans, as a punishment for their barbarous ruthlessness, from trade in China. This pronouncement is in accord with the aims of the Allies. The most promising market of the world as a recouping ground for the Allies is undoubtedly China. With its enormous settled population, its primitive methods of livelihood, and its virgin resources, it affords a magnificent field for commercial expansion and industrial development. It was here that the Germans in particular hoped to plant their flag permanently. With the acquirement of Kiaochow they planned to establish themselves in an impregnable commercial and industrial position, and great efforts were put forth, before the war, to make their center loom large in the eyes of the Chinese. From that point of vantage in the rich province of Shantung they have been ousted, and though many of their mercantile men, experts in the China trade, were taken prisoners of war, and are still held as such, by Japan, there are numerous others who have hoped to retain their hold pending the arrival of peace so that they might resume their labors with increased vigor and consummate the great plans being developed in Germany for the after-war commercial campaign.

The fatuous actions of many of the Germans in endeavoring to use China as a base for further "frightfulness" against the Allies has, however, been the means of compelling thinking Chinese to regard them in the same light as they are being looked upon by those nations whose citizens have been victims of their wanton atrocities. The declaration of the Chinese Minister of Finance is the first public pronouncement of the feeling which is being entertained by Chinese, however, and it augurs ill for the Germans. China has become an Ally in the war, and the Minister of Finance says she will remain an Ally in the straightening out of the mess into which Germany has with malice aforethought plunged the world, so that decent people will be able to live at peace in the future. Germans are not wanted in

China, that is obvious; and if the Minister of Finance can have his way, steps will be taken forcibly to bring the fact home to them. He wishes to do as a national undertaking what America in large measure will do through individuals. When President Wilson declared himself against a commercial war, a prominent American paper pertinently pointed out that after all it is not nations that transact business, but individuals, and that for many years after the war thousands of individual business men will have nothing to do with "the blood-smeared representatives of Germany's business interests. Can it be expected," asks the

Exporter's Review, "that a merchant whose mother, wife, or children went down on the *Lusitania*, or some other boat sunk by the 'mad dogs of the sea,' will greet a German salesman who, for all he knows, may have fired the cowardly torpedo that did the sinking; who may have had a hand in the murderous air raids that slaughtered hundreds of innocent women and children; who may have participated in the raping orgies of Belgium and Northern France; who may have poisoned wells, girdled trees, defiled and robbed residences, or helped in countless atrocities perpetrated wherever the German forces penetrated? No; for many, many years Germans and German-made goods will be a hissing and a byword in all civilized countries, and particularly so in the countries with which they are at war, as well as with the colonies of those countries. . . . Where in the world can the German turn to after the war, without expecting to be welcomed with a swift kick where it will do him the most good and give the most satisfaction to the kicker? Certainly not in Great



"RAUS MIT IHM"

Britain or her colonies, nor in France, Belgium, Italy, or their colonies. And why should the merchants of the United States wish to trade with people who have wantonly murdered peaceful American travelers, who have blown up American munition plants, who have sown sedition broadcast in this country, and who have endeavored by foul means to monopolize the foreign trade of the world? It is fitting that, regardless of any trade compact between the Allies, German goods should for some time be barred from the world's markets, as this would be but a just penance for the German people to atone for their misdeeds."

These are also the sentiments of the Chinese Minister of Finance, and a great number of Chinese merchants, and now that so distinguished a publicist as Mr. Liang Chi-chiao has come

forward with a public pronouncement that China also intended to make the road hard for German trade it would seem that the largest market in the world will be difficult of access if not actually closed to the German traders and manufacturers.

It is significant, however, that the German Government and people attach little attention to the present-day avowals against them. Whether this is due to the belief that the public mind is notoriously forgetful, and will therefore fail to remember for any time after the declaration of peace the frightful horrors committed during the war, we cannot say. Certain it is that they are making great preparations to reach out into the world's markets, and this being so it becomes increasingly necessary for those concerned in defeating such a scheme to consider what is contemplated, and note the steps which are being taken to insure success. This aspect is emphasized in a report issued by the United States Bureau of Foreign and Domestic Commerce, on "German Foreign Trade Organization," and the special attention of the Chinese is directed to it. It was in China that the "mailed fist" policy was first publicly expounded, and yet it was to China as a field for exploitation that Germany ultimately looked for vast expansion along commercial and industrial, if not territorial, lines. It now behooves China carefully to observe and take steps to counter the organization which Germany is now creating to make good her war losses after the declaration of peace.

In the German commercial high schools of the present time emphasis is more than ever being laid on the higher courses in preparation for foreign trade. At the commercial high school in Berlin, for the winter semester, 1916-17, 115 separate courses of instruction were offered. These included general introductory courses in business practice, courses in administration, factory organization, banking, transportation, insurance, foreign policies, law, marketing, chemistry and chemical technology, physics and mechanical technology, geography, foreign languages, commercial education and stenography. Of special interest are the courses on the general science of world trade; specialized international business science (trade of middle and western Europe with a review of the trade in trans-Atlantic products); the science of international trade; bank organization in England, France, and Germany; money markets and banks issuing notes in the belligerent countries; German banking technique in war; railroad traffic and rate-making; insurance practice with special reference to international relations; the economic importance of the Germans abroad; commercial policies, the problems of international economic policies; German policies in the Orient; the political and economic organizations of the world war and their effect upon its operation; practical exercises in commerce and industry; commercial law and international commerce; German coöperative organization as a result of the war; coal and iron; the economic chemistry of vegetable and animal products; valuation, treatment, and utilization of grain and the establishment of grain elevators; the study of machinery; visits to industrial and other technical establishments; general geography; commercial geography; the commercial geography of France and Italy; elementary and advanced courses of practical exercises in commercial geography; economic conditions in Russia; Russian language; course in French, Italian, and Spanish; elementary and advanced Turkish and artistic advertising (with lantern slides).

At the same time, that is, in 1916, in the midst of the war, the University of Berlin was offering no less than 94 courses of study especially referred to as "preparing for commerce and industry." These courses cover commercial and maritime law, economics, sociology, international law, government, history, geography, and foreign languages. There were in the curriculum specialized courses in world trade, commercial geography (a large number of courses covering Europe in detail), and language courses in Danish, Swedish, English, French, Italian, Spanish, Polish, Arabic, Russian, and Turkish.

Whatever may be the outcome of the war in Europe, Germany is going to make as active a canvass for the export trade as its resources and financial condition at the end of the war will allow. At the present time German over-sea commerce is reduced to practically nothing. The German exporters, however, are endeavoring to keep in touch with their foreign

markets and are doing everything they can to preserve their good will in those markets.

Among the preparations for the period following the war the international movements between Germany and Austria-Hungary are most interesting. In the common cause of war the two Empires have been brought very close together, and it is felt generally that following the war they will remain in the closest of economic—possibly, also, political—relations. Bulgaria and Turkey, likewise, have been brought closer to the two great central powers by the war, and less clearly formulated efforts are being made to align them with Germany and Austria-Hungary when the war stops. Germany is undertaking the systematic organization of commercial education, for the promotion of trade by the German settlements in foreign countries will develop banking and shipping facilities, trade-promoting agencies and trade associations, and will institute painstaking cultivation of foreign markets.

Of all countries China is the one in which the Germans hope for the largest share of success, basing their belief of big business upon what has been regarded as the half-heartedness of the Chinese in entering the war. While the Germans still remaining in China are suffering as a result of the war measure, they profess to regard the conditions as the inevitable result of Allied pressure—pressure which China was too weak to withstand. We happen to know that Allied pressure was not responsible for China's declaration of war, and now that the Minister of Finance has definitely announced his feelings with regard to after-the-war treatment of Germans, irrefutable testimony is given that Germany cannot expect the Chinese calmly to acquiesce in the brutal terrorism which they have adopted in their frantic endeavor to win the war. China can no longer be counted upon by the Germans as a happy hunting ground, and there should be insistent effort on the part of the Chinese Government to bring that fact home to them convincingly. There should, as a first step, be a general internment of enemy subjects, and a general winding up of enemy businesses. At the very least, trading with the enemy should be rigorously forbidden. When something of this kind is done, America and the Allies will know that China is really in earnest, but the expressions of the Minister of Finance are an earnest of the fact that thinking Chinese fully appreciate all that the Allies are fighting for—and why.

INDUSTRIES IN KARAFUTO

Karafuto, or Japanese Saghalien, has witnessed considerable development in recent years. The island now supplies 47,000 tons of pulp, one third of the amount required in Japan. There are several Japanese companies engaged in the pulp industry in the island. The Russo-Japanese Fishery Company has begun fox breeding with a capital of ¥300,000. The Japan Fox Breeding Company has been organized to take up the industry, with a capital of ¥150,000. The herring, salmon, and cod fishery is making good progress. The Karafuto Fishery Company and one other company are going to begin cod fishing to meet the demand from America. The coal deposits in the Japanese part of the island are estimated at 530,000,000 tons.

JAPANESE IN SOUTH MANCHURIA

At the end of last August there were 110,374 Japanese in South Manchuria, an increase of 7,000 since December. The rate of increase has been more remarkable since last April, the average increase being about 1,000 or so. The Japanese population in the district under the Jurisdiction of the Dairen Civil Administration is 44,497.

Japan and the United States and China

The New Pact Signed by America and Japan Reaffirms the Principle of the "Open Door" and "Equal Opportunity," and Recognizes That Japan Has Special Interests in China

A great step forward in the settlement of the Far Eastern Question was taken on November 2, 1917, when Mr. Robert Lansing, Secretary of State at Washington, and Viscount Ishii, Japan's Special Ambassador to the United States, exchanged documents in which the desires and intentions of the Governments of America and Japan with regard to China were set out. The announcement of the agreement arrived at was published on November 7 simultaneously in Japan and America, and the contents of the letters exchanged (which are published below) were communicated to the Chinese Government by the Japanese Minister at Peking, Baron Hayashi.

Both the Governments concerned have deemed it expedient to make a declaration on the ground that "mischievous reports" have tended to create misunderstandings if not to provoke graver difficulties, and China has reason to be particularly grateful that the understanding reached is so favorable to her interests. Insofar as Japan is concerned the agreement should completely remove the suspicions entertained in China as to her motives, and should effectively silence the alarmist prognostications as to Japan's territorial ambitions in China which have found ready acceptance in most parts of the world.

That Japan's motives have been impugned is more the fault of a section of the Japanese press and the acts of the previous Cabinet than anything else. Minatory utterances in Japan, coupled with the effect of the notorious Twenty-one Demands of 1915, prepared the Chinese mind for anything, malgré the declarations of the present Government that a change in the policy of Japan towards China had been made, and the Chinese were ready to believe any rumor however wild. The activities of the party in Japan favoring "strong" action in China savored so much of what had been done in 1915 that even the best intentioned observer in China found it difficult to place reliance in the asseverations of the Government that friendly intercourse would henceforth replace the use of drastic measures. And that being so, such a public declaration as that made by Japan in company with America was vitally necessary to remove all doubts and clear the way for the legitimate development of the multifarious opportunities that lie at Japan's hand. Had Japan not procured the association of America in the declarations now made she would have found it increasingly difficult to proceed with the legitimate affairs in which her nationals are engaged in China. Always there would have been deep suspicion on the part of the Chinese, with consequent obstruction; always there would have been intense distrust on the part of other foreigners operating in China with consequent ill feeling, jealousy, opposition, and recrimination.

Chinese Fears Groundless

The fear of both Chinese and foreigners was that Japan would take advantage of the war in Europe rudely to override the country, assume control of its principal services, and operate them to the particular benefit of her people and her own national interests. Apparently Japan never had any such intention, and there will be many exceedingly glad to have it so definitely affirmed. That there is a division of opinion in Japan on the subject of the agreement is natural. There always has been a division of opinion as to policy in China. The thinking leaders of the mercantile section of the population have cordially disapproved the forceful character of the past actions of the Government. The threat of force always meant the creation of hostility on the part of the Chinese people, and such

hostility immediately recoiled on the unfortunate merchants and manufacturers in Japan. The aggressive military faction never had to pay for any ill feeling caused by their clumsy efforts to secure predominance. Losses by cessation of trade, by boycotts, by temporary ill feeling against Japan had to be met by the unfortunate exporter or importer of Japan whose business promptly suffered.

The newly published undertaking is then a distinct triumph for the Japanese merchant and manufacturer. He will be able to go upon his way rejoicing, fearing neither ill-considered diplomatic enterprise on the part of his Government threatening the integrity of China, nor questions as to his motives with regard to the principle of the "open door" and "equal opportunity" on the part of foreign rivals. And China can be happy in the security which is thus provided for her—security against the aggression which she has regarded with wholesome fear during the past year or two, and security against any attempt on the part of Japan to encroach upon her sovereignty or attempt to secure special rights calculated to affect her independence or territorial integrity.

The recognition by America that the territorial propinquity of Japan to China gives her special interests in China does not mean anything injurious to China or the interests of other nations. The undertakings to preserve the integrity of China and equal opportunity for trade, etc., nullify any such effects as the recognition of *predominant* interests would create, and that being so China has much to congratulate herself upon. With the exception of the mention of special interests the documents merely reaffirm the policies previously entered into by various countries and frequently referred to in recent times in the REVIEW, and since this has been done there is every reason why many agitated people should live a little easier, if not in entire tranquillity.

Reforms Now in Order

The possibility of Japan descending in her might upon China has always been a bogey—a bogey that is just as well laid to rest—and while it was a terror to the Chinese it was also constantly disconcerting foreigners. Now it has gone, and with its going, we trust to see inaugurated an international peace in China that will enable the Central Government to take advantage of the times to put its house in order and initiate the reforms which have so long been awaiting introduction.

While Viscount Ishii deserves much credit for arriving at the means for restoring confidence for Japan in China, his work is but the conclusion of that begun by Baron Shibusawa in America in 1915-1916. Baron Shibusawa, as a private visitor to America, then did excellent pioneering work in bringing about a better understanding between Japan and America, and the fact that his mind runs along commercial and industrial lines rather than along political lines brought him quickly into touch with American sentiment and thought. So far as China is concerned, he has always preferred the influence of friendly, commercial intercourse to the political bludgeon to exercise a change in the minds of the Chinese as to the manner in which they should regard the Japanese. Men of his type have always deplored the ill feeling created in the Chinese mind by the unnecessarily harsh methods of the aggressive faction in Japan, and whereas the latter have had the field up to Count Terauchi's assumption of power, it is now the time for the commercial men to feel relieved and endeavor

entirely to wipe out the ill effects of the policy in China of the last administration. The letters exchanged with regard to China are as follow:

Text of America's Note

Department of State,
Washington, November 2, 1917.

Excellency:—I have the honor to communicate herein my understanding of the agreement reached by us in our recent conversations touching the questions of mutual interest to our Governments relating to the Republic of China.

In order to silence mischievous reports that have from time to time been circulated, it is believed by us that a public announcement once more of the desires and intentions shared by our two Governments with regard to China is advisable.

The Governments of the United States and Japan recognize that territorial propinquity creates special relations between countries, and consequently, the Government of the United States recognizes that Japan has special interest in China, particularly in the part to which her possessions are contiguous.

The territorial sovereignty of China, nevertheless, remains unimpaired, and the Government of the United States has every confidence in the repeated assurance of the Imperial Japanese Government that while geographical position gives Japan such special interests they have no desire to discriminate against the trade of other nations or to disregard the commercial rights heretofore granted by China in treaties with other Powers.

The Governments of the United States and Japan deny that they have any purpose to infringe in any way the independence or territorial integrity of China, and they declare, furthermore, that they always adhere to the principle of the so-called "open door" or "equal opportunity," for commerce and industry in China.

Moreover, they mutually declare that they are opposed to the acquisition by any Government of any special rights or privileges that would affect the independence or territorial integrity of China or that would deny to the subjects or citizens of any country the full enjoyment of equal opportunity in the commerce and industry of China.

I shall be glad to have Your Excellency confirm this understanding of the agreement reached by us.

Accept, Excellency, etc., etc., etc.

ROBERT LANSING.

Japan's Reply

Japanese Embassy,
Washington, November 2, 1917.

Sir,—I have the honor to acknowledge the receipt of your note of to-day, communicating to me your understanding of the agreement reached by us in our conversations touching the questions of mutual interest to our Governments relating to the Republic of China.

I am happy to be able to confirm to you, under authorization of my Government, the understanding in question set forth in the following terms:

In order to silence mischievous reports that have from time to time been circulated, it is believed by us that a public announcement once more of the desires and intentions shared by our two Governments with regard to China is advisable.

The Governments of Japan and the United States recognize that territorial propinquity creates special relations between countries, and, consequently, the Government of the United States recognizes that Japan has special interests in China, particularly in the part to which her possessions are contiguous.

The territorial sovereignty of China, nevertheless, remains, unimpaired, and the Government of the United States has every confidence in the repeated assurances of the Imperial Japanese Government that while geographical position gives Japan such special interests they have no desire to discriminate against the trade of other nations or to disregard the commercial rights heretofore granted by China in treaties with other Powers.

The Governments of Japan and the United States deny that they have any purpose to infringe in any way the independence or territorial integrity of China, and they declare furthermore that they always adhere to the principle of the so-called "open door" or "equal opportunity" for commerce and industry in China.

Moreover, they mutually declare that they are opposed to the acquisition by any Government of any special rights or privileges that would affect the independence or territorial integrity of China or that would deny to the subjects or citizens of any country the full enjoyment of equal opportunity in the commerce and industry of China.

I take, etc., etc., etc.

K. ISHII

Ambassador Extraordinary and Plenipotentiary
on Special Mission.

JAPAN INCREASES ELECTRIC POWER

The development of industries in Japan since the war started has greatly increased the demand for electricity as motive power. This has especially been the case in Osaka and neighborhood. As a result, the electric companies in that part of the country have been taking steps to enlarge their equipment with the object of increasing their supplies of electric motive power. It is expected that when these extension projects are completed, the supply will show a remarkable increase. For instance, the present capacity of the Osaka Electric Light Company to supply motive electricity is 47,400 kilowatts, but on the completion of its extension work its capacity will be increased to 115,000 kilowatts. The following table shows the present and expected capacities of the electric companies in Osaka and neighborhood:

	Present Kilowatts	Expected Kilowatts
Hanshin	4,000	19,000
Osaka Electric	47,400	115,000
Koya Railway	500	3,000
Nankai Railway	2,500	12,500
Uji Hydro-Electric	44,000	124,000
Keihan	3,200	13,200
Minomo	1,070	6,070

Viscount Suyematsu, Privy Councilor, former Minister of Communications of Japan and who saw the beginning of the Electrical industry in Japan, recently made a statement of what has been achieved by Japanese electricians. At the close of September this year there were 573 power and lighting plants, 42 electric tramways and 48 plants combining both. In those enterprises ¥673,714,162 in capital was invested, of which ¥46,544,604 only was placed in tramway companies while the rest went for power lighting, and other plants. Compared with the corresponding period of last year there was an increase of 37 enterprises with a combined capital of ¥44,209,790. Further, in comparison with ten years ago there is an increase of 400 per cent in the number of plants and of 500 per cent in the capital invested.

The total amount of power generated at the end of September was 915,021 kilowatts. During early years most power was generated by steam power, but now it is being supplanted by water power. Now 695,733 kilowatts are generated by water power while only 219,288 kilowatts are generated by steam power. The first water power plant in Japan was constructed only recently but its example is being followed eagerly and now there are 941 power stations, which can generate more than 2,586,000 horse-power if operated to the fullest extent. Tramways have also been introduced slightly more than a decade ago, but now the total mileage amounts to 836 miles, the rate of progress being 500 per cent in ten years.

No up-to-date report is available as to the use of the power thus generated, but the official report for 1915 says that 3,051,925 families use electrical lamps which number 7,538,329. The remainder of power is used by dyers, machine makers, ironworks, chemical mills, foodstuff manufacturers, miners, metal refiners, and others, their total consumption coming up to 527,248 h.p.

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CONTENTS

	PAGE
Caring for the Tientsin Flood Sufferers	765
How the Water Was Pumped Out of the British Concession, Tientsin	767
Chihli Province River Conservance	770
River Conservance in Northern Anhwei	772
Philippine Foreign Trade	774
China and Germany's After-the-War Trade Efforts.....	775
Japan and the United States and China	777
Japan Increases Electric Power	778
Need for Industrial Development in China.....	779
Japan and the China Market	780
American Manufacturers and "Weaker Nations".....	781
Chemical Fertilizers for China.....	781
Saving Japan's Commercial Reputation	782
Utilization of Chinese Resources	782
Some Dangers of Railway Development in China.....	783
Cotton in China	788
China's Tin Mines.....	790
The Shuikoshan Zinc and Lead Mines.....	792
The New China and Modern Industry and Commerce.....	797
Sugar in Manchuria.....	799
Silver Hoard of the United States.....	800
Federated Malay States Trade	800
Japan's Cotton Industry.....	801
Motor Industry after the War.....	802
Coir Mats as a Philippine Industry.....	803
Rubber in Indo-China	803
Trade Development of China's Central Ports	804
New Gold Dredger in Parole	807
Engineering and Financial News.....	808

NEED FOR INDUSTRIAL DEVELOPMENT IN CHINA

The industrial development of China is so deplorably backward that one almost despairs of the Central Government ever being inspired to throw off the lethargy which has throttled the country for the past three centuries. Had the builders of the Grand Canal, the Great Wall, and the splendid roads and bridges of that time—all now in decay—had the magnificent opportunities which now lay before the present-day Government, it is certain that they would unhesitatingly have taken advantage of them to the fullest extent. It is inconceivable that men with the talent and the skill to construct what are now but crumbling monuments to a more energetic period would have allowed the world to march past them in the matter of national and material advancement, but despite the great lessons which to-day are being taught the Chinese nation on every hand, we find little desire on the part of those officials who have it in their power radically to alter conditions to attempt systematic organization with the object of enabling China to come into her own. What little has been done so far has been solely due to foreign pressure, and unless the Government bestirs itself, it is certain that nothing more will be done if not prompted by the influence of foreign nations.

What might be done can be realized by the officials if they will but for one moment observe the nature and effect of the valuable constructive work which has been accomplished by Japan in the decaying country of Korea, and in Japan itself. Japan, without a tithe of the resources and potentialities of China, has risen to the rank of a first-class power. She has transformed her own country from a group of medieval feudal states into a power to be reckoned with by the rest of the world—a power which, by virtue solely of its progress, has been able to command the attention of America, engaged as she is in vast war preparations, to the consideration of a proposal to admit that it has "special interests" in China, and that therefore some new diplomatic instrument is needed to record that fact and so permit continuous development in this region with freedom from suspicion and danger from misunderstanding. China might well ponder the significance of this fact, and if she is shamed into action by the realization of the great difference in the standing in the comity of nations of herself and Japan so much the better. Japan has raised her status by the simple application of those recognized principles of economic development which have procured for other great powers their high state of advancement. Primarily Japan has sprung into prominence by the intelligent adoption of applied science. She has built up great industries, great transportation companies, great public utilities; and built them up with such regard for thoroughness as to detail that they are able successfully to stand the keenest comparison with any similar organizations in any other country. Her public works are characterized by a solidity which is striking, and her modern industries are remarkable for their efficiency. China has produced nothing to compare with what Japan has done in these avenues of human development. Take the expansion which has occurred in Japan since the war broke out alone. We find that Japan had the sagacity and the enterprise to leap into the great business of supplying war material immediately the possibilities were recognized. China did absolutely nothing. Japan has reaped immense fortunes. China has gained nothing. Japan has established new industries to the total of 4,987 with an aggregate capitalization of Y.197,536,166. Of this total, in a purely manufacturing way, she has built up 4,449 industries comprising breweries, 349, with a capital of Y.5,594,196; comestibles, 526, capital, Y.11,801,536; fiber, 629, capital Y.27,887,747; chemical, 476, Y.30,021,926; kiln, 193, Y.6,229,425; metallic, 265, Y.21,163,368; ship and car building, 35, Y.2,777,150; machinery, 291, Y.11,952,683; gas and electric, 171, Y.7,538,750; others, 1,512, Y.23,239,988, or a total of Y.147,297,769. Advancement is particularly noticeable in machinery manufacturing industries which were in an infant stage before the war. In China scarcely anything has been done at all, and China has not figured in any way as a supplier of war material

of a manufactured kind. She had opportunities to do much in ship building, but for some reason best known to the Navy Board, which controls the Kiangnan Arsenal and Shipyards, opportunity was allowed vainly to knock at the door. These industries, combined with the great number established before war broke out, enabled Japan to reap a rich harvest and materially better her people and her national standing.

The Japanese constructive work in Korea alone should be sufficient to awaken China. There the Japanese officials recognized that the advancement of the material welfare of the impoverished Koreans was of primary importance, and forthwith set themselves strenuously to encourage agriculture and industry by establishing model farms, experimental stations, and seedling stations, by granting state subsidies, and by appointing technical experts to the various localities. Now larger returns from these productive industries are being obtained year by year, with the result that the conditions of life of the people have been improved correspondingly. The work undertaken with the Imperial Donation Fund of Y.17,398,000, which was distributed among Prefectures and Districts immediately after annexation, has been highly beneficent. The undertakings were aimed at affording a means of livelihood for the *Yangban* and literati class—many of whom had no permanent occupation or substantial property—as well as to unemployed Koreans. These undertakings were carefully selected so that they might be varied to accord with local conditions. Training stations for sericulture filature, weaving, agriculture, fishing, manufacture of paper, hemp, cloth, matting, and charcoal, etc., were established, and by 1914 institutions of this nature giving long-term training were in operation in 112 centers, and 2,050 persons were then receiving instruction, bringing the total to 9,989 since the organization of these undertakings. The result of these measures, combined with the general encouragement to industrial development, is that a marked impetus has been given to the advancement of local industry. In 1914 the production of rice, the chief agricultural staple of the peninsula, which stood at about 8,000,000 *koku* (a *koku* is equivalent to 4.9629141 bushels) increased to 12,159,000 *koku*; barley increased from 3,500,000 to 6,000,000 *koku*; cotton from 11,000,000 to 36,000,000 *kin* (a *kin* equals 1.3227727 lb.); cocoons from 13,000 to 46,000 *koku*; mineral products from Y.6,967,952 to Y.8,402,649 in value; fishery products from Y.7,871,910 to Y.12,064,685; and the output of factories from Y.19,000,000 to Y.32,700,000. Trees planted for afforestation purposes by the Government and by individuals during the five years ended 1914 aggregated 180,000,000, and the work has been systematically proceeded with each year since.

That China has not been devoid of officials who have recognized the supreme importance of improving the natural products of the country and of promoting industry is conceded, but they have not been in power for a sufficient length of time to enable any of their plans to mature. One of the most progressive cabinet Ministers that China has had is Mr. Chow Tze-chi. He initiated plans for the betterment of cotton cultivation, tea planting, silk production, and afforestation, and had his work been continued, there would have been noticeable results by this time. Unhappily his successor promptly curtailed the activities of the men appointed to carry on the schemes and once again there is stagnation. The time has now come, however, when the Government must initiate reforms for the betterment of trade, commerce, and industry. If it does not, then the work will be done for it by one of the several countries largely interested in China.

JAPAN AND THE CHINA MARKET

At a recent meeting of the Federated Chambers of Commerce of Japan it was decided to inaugurate a Sino-Japanese Exhibition to be held in China. Strenuous efforts have been made by Japan to cultivate Chinese friendship since the accession to office of the Terauchi Ministry, and its definite announcement of abandonment of the aggressive policy towards

China which caused large sections of Chinese to entertain deep suspicion of Japan and exhibit bitter hostility towards her people. There has been reciprocity of friendship, too, on the part of many Chinese, and cordial welcomes have been given the various Japanese delegations which have recently been visiting the country. The proposed exhibition is to be a sort of climax to the friendly overtures which have been proceeding, and it is the intention of the Japanese, if possible, to make it a permanent reminder to the Chinese of the potentialities for profitable trade and commerce which abound, and which require nothing but simple sagacity, reasonable confidence, and cultivated opportunity fully to develop and bring forth satisfying fruit. The idea of an exhibition is undoubtedly a good one. Although Japan at present does a large measure of trade with China it is claimed that the Chinese do not yet know all that Japan can provide in the way of manufactured commodities. The Japanese have manufactured considerably for the Chinese trade, but mainly in supplying articles hitherto made in other countries or in China. Thinking Japanese have now come to the conclusion that if there is a proper display in China of samples of all the things that are used by the people of Japan a large demand for them may be created among the Chinese, in which case the new avenues opened would make to the ultimate economic advantage of a wider circle of operatives in Japan. In this spirit the promoters are pushing on the proposal. It is therefore distinctly up to the Chinese to do their best to make the exhibition a success by securing adequate representation for all their products in the exhibition if it eventuates. China has so far done little or nothing in the way of large-sized advertisement. She does not, in fact, know much about the value of any sort of advertisement, and it would appear that she has no particular desire to learn. Japan, on the other hand, long ago appreciated the fact that advertisement pays, and her successful exhibitions abroad, plus those held in her own territory, have been convincing in every respect. Now she intends to try a hand in China, and since such an exhibition will be beneficial to all who buy and sell there is no reason why it should not be eminently successful and of lasting benefit to both countries—but particularly to China. The lessons it should teach may furnish the fillip necessary to put China on the way to organize industry and thereby ameliorate the conditions of her own people. If it does that much Japan will gain lasting *kudos* for an important advance in the economic and social development of China, and if it does less than that it should still be worth doing, if simply that those Chinese who wish to progress may receive inspiration.

That Japanese trade with China is growing and will further expand is certain. The war will be a large factor in determining that. Other countries that have been large suppliers are now temporarily out of the market, and will remain out of it at least till the war is over. In the meantime, Japanese suppliers have the opportunity to expand their undertakings. That they can fill the field or even monopolize it, however, is impossible. China is a vast market in which there is room for all engaged in legitimate trade. Great as is the foreign business which is already done it is safe to say that but the fringe has so far been touched. When Chinese restrictions are removed, when the paralyzing inland tax known as *likin* is abolished, and when the Chinese Government encourages instead of obstructs the manufacturer and the merchant, not all the foreign countries combined will be able to meet their own needs and those of the Chinese consumers. When it is remembered that China is virtually a virgin field, that industry has not yet started to develop, that there exist no proper means of communication to reach the thickly populated interior, or for the products of the interior to reach the markets fed from the sea ports, then it will be realized by those who are at present prevented from participating in the China trade that there is no fear in generations of them being excluded by the activities of those more favorably situated for the time being. The demands of a China freed from the trammels forged by ignorant officialdom in the past, and which unhappily still remain, will be immense. What now has to be done is to convince the Chinese Government of the wisdom of striking off the shackles, and they will readily do that when they have it brought home to

them that national greatness can never be achieved while the mass of the people are prevented from developing their resources by vicious taxation, deliberate official obstruction, and neglect of communications.

AMERICAN MANUFACTURERS AND "WEAKER NATIONS"

The reception which the American Note to China of last June received at the hands of a section of the press of Japan roused quite a little attention in America. Among other things, it inspired the American Manufacturers' Export Association to hold a meeting early in September, and as a result to express its sentiments to the Secretary of State, Mr. Robert Lansing. It will be remembered that a number of newspapers in Japan were extremely critical of America, and were prompted to their expressions by the receipt from a correspondent in America of a garbled version of the American Note. They were led astray, in fact, by the publication in Japan of the comment of a New York newspaper as the text of the Note, and it was some time before the misunderstanding was cleared up. Thinking Japanese were prompt in their condemnation of the attitude of the newspapers, which jumped so incontinently upon the back of America, and some of the papers frankly regretted their precipitancy when the terms of the actual Note came to their notice. However, the damage was done, and because ill feeling was aroused unnecessarily, the lesson might well be learned that care must be exercised by those tempted to place credence in the utterance of irresponsible publications. The Japanese Government, too, might well take into consideration the desirability of curbing the section of the press that appears ever on the alert to make mountains out of molehills, for the simple reason that no one unversed in Japanese journalistic life can tell what is a paper of standing, and what is a mere unbalanced sheet. A newspaper is a newspaper to the outsider uninitiated in the mystery of newspaper activity in the Far East, and if its tone is obnoxious to western nationals, if its asseverations are offensive, then whatever steps are taken by those affected, or whatever opinions they form of the character of the Japanese, national and otherwise, reacts upon the nation as a whole rather than upon the individuals responsible. Japan has, by reason of her irresponsible journals, suffered much in the opinion of all foreigners, and the blame for this can almost solely be placed at the door of sheets whose chief aim in life seems to be to stir up trouble with other countries. The effect of this sort of thing is likely to be extremely serious to Japan. How other nationals are moved is evidenced by the following resolution sent to Secretary of State Lansing by the American Manufacturers' Export Association:

"At a meeting held September 5, the board of directors of the American Manufacturers' Export Association, in which are represented more than 600 manufacturers of the United States, many of whom are exporting their products to the Far East, and all of whom are concerned in the safeguarding of American commercial interests abroad, have unanimously adopted the following resolutions:

"Whereas, The friendly and benevolent message of President Wilson to China of last June, a time of internal dissensions in that country, in which was expressed the sincere hope that China in her own interest and that of the world would reestablish internal tranquillity and political coördination, has given rise to much discussion in the Japanese press and Japanese Diet, and the right of the United States to communicate friendly advice direct to China has been questioned therein, and

"Whereas, Statements recently published in Tokyo attributed to officials and interviews in America with unofficial Japanese claim for Japan a special position relative to China, and

"Whereas, Political paramountcy in China of any one country would be inconsistent with American rights acquired by treaty with China and would be contrary to the policy of the open door, which has been accepted by all the powers, and

would result in the impairment of the territorial integrity of China, and of the independent form of its Government, and

"Whereas, In our opinion, a frank expression of the American position vis-a-vis nations, politically and economically less strong than itself, would further the traditional friendship between the United States and Japan and insure a 'still closer concord and a deeper confidence'—to use the words of the brilliant head of the Mission from Japan, now in the United States;

"Now, therefore, be it

"Resolved, That the United States, having no desire for spheres of influence nor wish for economic advantages obtained through political dominance, cannot recognize the claim of another government for a special position relative to a third country nor the claim for 'special interests' therein unless acquired by international agreement and always subject to existing treaty rights, and further be it

"Resolved, That any procedure affecting the freedom of action of a nation or to any degree the full exercise of its sovereign powers would be contrary to one of the principles to uphold which our country is now at war—namely, the protection of weaker nations from the control of any of their functions against their will by more powerful nations."

CHEMICAL FERTILIZERS FOR CHINA

Modern chemical fertilizers are practically unknown in China and the Chinese cultivators who are in the front rank as soil handlers fail to reap a full return from their labor and skill because of this neglect. The good hand cultivation in China, the conservation and the use of waste materials, the use of organic residues,—e.g., human excreta, vegetable cakes, etc.—all tend to produce conditions of soil which would be most responsive to supplementary dressings of chemical fertilizers. There is need for the maximum agricultural output in China: the food supply for her teeming population is a serious problem even in years when flood or drought do not reduce the harvests. China is the motherland of the tea and the silk industries—both of agricultural nature—and she is not keeping pace with, still less making headway against, competing countries. Not even all the reputation for quality attached to Chinese tea and Chinese silk atones for the lack of an organized progressive agricultural policy.

The whole agricultural mentality—from the Minister of the Department down to the village heads—requires to be roused and awakened. There are plenty of modern instances to study and be encouraged thereby. Egypt's finances were in a hopeless condition and for resuscitation had to depend on honest administration and agricultural improvement. The revival of Egypt is an emphatic lesson on the profits—to individuals and to the state—to be earned by controlled irrigation and up-to-date use of modern fertilizers. Nothing but apathy and fecklessness prevents an immense advance in the total output and the quality of Chinese cotton though it should never attain the level of the corresponding Egyptian product. Japan's export of silk is growing at a rate out of all proportion to that of the same industry in China, though China is the original home of the silk industry. It is true that that proper attention to the use of suitable fertilizers is only one factor in promoting the mulberry growth and the resultant silk industry, but the same careful progressive mental attitude towards all coöperating factors of production cannot fail to bring about steady growth of output and increase of profits. Within the last ten years Japan has largely increased the import of nitrate of soda as a fertilizer principally for the mulberry crop, and the following figures have more than a casual connection.

Year	Import to Japan	Export of Raw Silk
	Nitrate of Soda	
	Yen	Yen
1908	609,419	108,609,052
1912	1,996,799	150,321,198
1916	6,184,862	267,036,616

The three greatest chemical fertilizers employed in modern countries are in order of quantity annually used,—superphosphate of lime, nitrate of soda, sulphate of ammonia. Superphosphate of lime is a most important ingredient for all grain or seed bearing crops. This fertilizer is manufactured from phosphate rock found in abundance in many parts of the world. Nitrate of soda from Chile is annually used to the amount of 2,500,000 to 3,000,000 tons partly for chemical industries but most largely as a nitrogenous fertilizer for all crops grown without continuous irrigation. Mulberry, tea, cotton, sugar cane, sugar beet, maize and cereals, tobacco, rubber, and all fruits come under this category. Nitrate of soda is particularly adapted for market garden or truck vegetable growing. Sulphate of ammonia is of special interest to all Eastern cultivators because of its adaptability to the irrigated rice crop—the staple cereal for so many millions.

In the revision of her Customs tariff China should see to it that no hindrance is placed on the import of such vital necessities as chemical fertilizers. In most countries' such articles are admitted duty free as substances essential to the existence and well being of the state.

SAVING JAPAN'S COMMERCIAL REPUTATION

Because of the shortsightedness of a few among the army of Japanese manufacturers, the Japanese Government has had to take measures to bring the commercial pirates that were ruining the reputation of the nation's goods to a sense of their responsibility. The trade associations had previously tried to do this but their efforts, backed up as they were by the press of Japan whose editors did not hesitate to expose the black sheep even among their own advertisers, failed of full effect, and the government now has begun to act. With characteristic thoroughness, the rehabilitation of the smaller industries was left to the associates of the men who had wrecked them and the first move of the government was to preserve those great industries on which the prosperity of the country's mercantile circles most largely depended. Of all the textile products silk lends itself most readily to sophistication and it is therefore the first to feel the weight of regulations, not that the silk manufacturers needed curbing, or that they were more prone to see the immediate yen at the expense of the more distant million, but the country has more at stake in the silk business than in any other and the effect of regulations imposed at the top of the export list would be to make the manufacturer of less important lines extremely chary lest his business be regulated out of existence.

The regulations for the silk industry leave no loophole for the manufacturer. He must conform to government standards or be excluded from taking part in the export commerce. In case he has something new to try out, something that may or may not be satisfactory to the consumer, he does not send it out without hindrance until the protests from dissatisfied customers begin to come in. Not at all. He must first get the permission of the government and consult with the authorities in the silk trade. If he does not, the loss is his and the goods cannot get by the customs barrier. It would be a good thing if some other oriental countries, not to mention any names, were to take a leaf out of the Japanese book and regulate the dishonest manufacturer out of export trade. The Philippine Government's hemp inspection act is another case in point and it has worked such great advantage to the producer and shipper as well that other industries may later feel the guiding hand or paternal lash of the powers that be. The world has outgrown the wooden nutmeg and sanded sugar stage and is demanding that if shoddy goods and sophisticated wares are placed on the market, they shall be labeled according to what they are and not what the dishonest manufacturer has made them seem to be.

UTILIZATION OF CHINESE RESOURCES

The question of the utilization of the Chinese resources has passed the stage of argument says the *Japan Times*. For the development of Japan's economics and industries Japan must look towards the resources of China. In that country may be obtained iron ore, raw cotton, wool, hides and furs, rice, wheat, beans, and other cereals, and nearly every form of article that comes to the need of mankind are found in this country. The present stage of the problem is how Japan is going to obtain the rights to utilize the said resources. The greater efforts lie in the hands of the people and not the government. Of course for the rights of railway extension and that of the exploitation of the mines must be negotiated through the Government but these things have come to be looked upon as not the pivot of the question. The nature of rights are not for the acquisition of special rights; those belong to the diplomacy of government. The trend is for the Japanese entrepreneurs to study the markets of China and upon undertakings suitable to each section of the country, if license may be acquired.

War conditions have increased the wealth of Japan so that she can afford to invest in China. It is without question that if Japan is able to obtain raw materials from China, which she is resorting to Europe, India, and Australia for, Japan may be greatly relieved in many ways. But the question is, Jo what methods shall Japan resort for the possession of the privilege or right? It is said that there are two companies in China near the city of Hankow which come under the category of firms established utilizing the resources of China. There is a firm producing camphor oil under the management of a Japanese and the International Export Company, a canning factory under the management of British capital. The former is a joint stock of Japanese and Chinese which has taken the advantage of the large number of camphor trees in that part of China which were found to contain oils which may serve as original in the manufacture of perfumes. The undertaking is not a large one but forms a good example in the so much talked of joint undertaking of Japanese and Chinese capital in exploiting the resources of China. The latter is capitalized at \$100,000,000 with head office at London and branches all over the world. The factory at Hankow cans pork and other domestic animals. The output is large and boats of 10,000 tons capacity transport goods of this firm alone fortnightly or monthly. The method by which the factory obtain materials for its work is in the case of pork, for the firm to distribute boars to those natives who desire to keep pigs, on condition that for every three births one will be given to the company. They are raised to a certain size at the expense of the native, and handed over to the company. If so desired the company purchases the other two according to market rate. The method is advantageous to the Chinese. Concerning other animals, similar contracts are made. The company turns out enormously and enjoys large profits, as may be seen in the dividend of 33 per cent with further surplus profits which were employed in the building of a large warehouse. Such are two methods of the utilization of Chinese resources. They are carried in a very easy manner without any hitch. Thus the method of management seems to be the question of many business men but if a plan like the two above is hit upon then the rest comes easy and profitable.

Japan has started exploiting the iron mines of China and it remains for Japan to develop them so as to obtain large outputs. Other articles needed badly by Japan are raw cotton and wool. A certain expert has said that to change the quality of the Chinese products to a better one ten years will be required. If Japan is able to obtain a supply of these articles from China one can imagine the low cost of interest, transportation and the saving of time, etc. Therefore, Japan should take a whole-hearted interest in the reform to the betterment of the same. There are many other reforms to be made in agricultural lines also. If Japanese enterprisers could make a study of the market and offer something advantageous to the Chinese changing methods so that larger returns may be procured it is not a difficult thing to enjoy the like prosperity of the International Export Company or the other Sino-Japanese joint enterprise.

Some Dangers of Railway Development in China and How to Prepare Against Them

[BY DR. C. C. WANG, MANAGING DIRECTOR OF THE PEKING-HANKOW RAILWAY]

As a conclusion to a series of articles on China's railways published in the "Chinese Social and Political Science Review" Dr. C. C. Wang, who can be considered one of the first authorities on the subject, suggests that the Government should proceed to take the following seven steps in order to avoid the pending dangers:

1. To separate railways from politics.
2. To abolish likin along the railways.
3. Consolidation.
4. To complete the unfinished lines and to plan further construction in conformity with our financial ability.
5. To administer the railways as a business enterprise.
6. To encourage honesty.
7. To train up experts.

To Separate Railways from Politics

First of all, the administration of railways should be entirely separated from politics. Experience in other nations has invariably shown that unless the administration of railways is properly safeguarded from the influence of politics, railways will increase the corruption in politics and politics in turn will corrupt the railways. Politicians are the worst kind of men any nation can place in charge of the administration of railways. Railway posts may be marketed as political prizes, and railway rates and fares may be bartered for political selfishness. Political parties may exploit railways and railway finance for party ends. Unless and until we have properly safeguarded our railways from the evil influences of both politics and politicians, our railway administration will surely degenerate from bad to worse. Even such small positions as ticket clerks and porters may be bartered for political or partisan favors. Efficiency and discipline will disappear. Disorganization and corruption will grow. It may be added that in countries where republication institutions are encouraged, the administration of railways is more liable to suffer from the evil influences of politics than in more autocratically governed states.

To Abolish Likin along the Railways

Since likin only taxes the trader, one may question why we should advocate its abolition in connection with railway finance. The reason is that likin barriers bother the trader directly and hinder the railway indirectly. Railways, we may say once for all, depend upon the trader. What hurts the trader immediately, hurts the railroad eventually. Therefore, in order to insure the prosperity of the railroad, one must endeavor to remove the difficulties which lie in the way of the trader. Generally speaking, there is hardly any other institution that is retarding the development of railway traffic more seriously than the imposition of likin along the railways. The difficulty does not lie so much in the amount which is collected, as it does in the delay and damages, the cost of paying the taxes, and other inconveniences which arise from these collections. Indeed, what costs the trader in paying his taxes are often more than the taxes themselves. The reported corruption, extortion, and purposely committed damage to goods by the likin collectors upon helpless traders are too notorious to need emphasis. When these facts are taken into account, it is really a credit to our traders that they can still survive.

But without going further into the question, we feel it safe to say that the abolition of such barriers will not only meet with the hearty welcome of the honest trader, but will as well

prove a boon to the commerce of the whole country. And it is by the development of our commerce that our railways may earn more money, thus preparing to meet the approaching financial difficulties, which we have just pointed out. What is lost by the abolition of likin will be more than made up by the increase of railway revenue. To make up the loss of funds of the Ministry of Finances resulting from this abolition, the Government can easily require the railways to credit that Ministry with a lump sum every year equal to the likin revenue derived from railway traffic, which the railways are likely willing to do. By so doing, the Government will have everything to gain and nothing to lose. So it is safe to say that this is one of the very few reforms which will bring benefit to all and harm to none. The only people that will suffer from this reform will be the likin runners, and it is very likely that they will raise every opposition.

The competition between our commerce and industry and those of other countries also demands the removal of the likin obstacles along the railways. In this regard we have to remark that not only the customs tariffs but also all state railways, and to a certain extent even private railways in other countries, invariably make special efforts to help domestic industry. Germany, Belgium, Switzerland, France, Japan, etc., are some of the most obvious instances where customs and railway tariffs are well known to have been used to protect home industry, and their results are justifying their practice. But we have been following a diametrically different policy. *Instead of helping our home commerce and industry by showing them favors, we obstruct them in their uphill struggle against foreign competition and place them at a great disadvantage by subjecting them to the numerous inland impositions while exempting the foreign competitors.* For it is only imported goods that can be transhipped to any open port in the country upon paying a nominal *ad valorem* duty at the port of entry, while there is no way open to the home trader by which he may avail himself of similar immunities. This is not only harmful, but unjust and absurd; and it alone is enough to prevent our trade and industry from catching up with those of our competitors, to say nothing of the numerous other serious disadvantages which our industry has to face in its uphill struggle. In so far as we are tied up from raising or adjusting our absurd customs tariffs we have no other way to help our home industry than to place them on a fair basis with foreign competition by removing the obstacles resulting from inland taxes. [A commission will shortly sit to revise the customs tariff.—Ed. F. E. R.]

We owe this reform not only to the railways, but to our industries as well. The sooner this is done the better it will be. Some efforts have been made to effect some reform along this line in certain cases, but we feel it our duty to appeal to the Government to make this reform general and applicable to all cases; for the removal of likin barriers along railways will benefit the trader and increase railway revenue, both of which facts will prove advantageous to the nation.

Consolidation

The consolidation of railways has been found most efficacious, both in reducing expenses and in increasing efficiency. Practically speaking, the railway history of all countries agree in one respect; namely, in the beginning, the lines are always short, which have to undergo a period of consolidation or unification in order to become great transportation systems like those of America, England, France, and India, or a unified

system like that of Prussia. In England there were several hundred railway companies at the beginning, and the railways of each company averaged only about fifteen miles in length. But twenty-five years later, when the railway length of the country increased from five thousand to thirteen thousand miles, the number of the companies, on the contrary, decreased to twelve by consolidation; and these twelve large companies are continuing to amalgamate, especially in respect to traffic matters. In France, the number of independent systems was reduced from thirty-three in 1847 to eleven in 1852, and still further reduced to six in 1859. The railways in the United States give a still more vivid illustration of this fact. In spite of private ownership and Government interference, consolidation is very extensive. Thus most of the 250,000 odd miles of line in the country are controlled by some ten or twelve large trusts or operating companies. Most of the large companies operate more than 4,000 miles of line, and some of them have twice that much. If we consider the length of track, these figures will have to be doubted. Every one of the large American trunk lines is made up of scores of former separate lines. In other words, all our Government railways put together are barely enough to equal that of one company in America.

In the countries where there is state ownership, invariably all the state railways are consolidated as a unified whole, and placed under one central administration, with as few district administrations as efficiency of operation permits. Prussia has some 56,000 kilometers of state line, which are operated by twenty-one district directions, thus averaging about 2,700 kilometers for each district direction. Moreover, the business of one mile in Prussia is more than that of five miles in China. Furthermore, in the control of rolling stock and other matters which concern all the railways, there is only one central office which does the work for the whole country. In fact all cars and wagons of the whole country are considered as the common property of all the railways. They are placed under one central controller, with a number of district controllers, who distribute the rolling stock among the different lines, or divisions, according to their needs. The highest degree of economy in using and in handling the wagons is obtained.

Centralization of Swiss Railways

Turning to Switzerland, where nationalization dominates, the same thing obtains. The railways are managed by five divisional administrations, with a central administration at Berne as the headquarters. The control of rolling stock and other affairs of a general nature, which concern all the divisional administrations, are placed in a central office.

Economic and national reasons make consolidation inevitable. From the point of view of economy, the advantages to the public in speed, accuracy, and good organization have been obvious everywhere. Take the matter of rolling stock, for instance, by consolidation it can be used to much greater advantage, and millions upon millions of dollars can be saved every year. The pooling of rolling stock in America and in some of the European countries like Germany, Switzerland, etc., are proving of unmistakable advantage. By this process, it is understood that the whole system of railways can get along with about three fifths of the former quantity of rolling stock in doing an equal amount of work,—which means the saving of millions of dollars.

By consolidation, the administrative and other general expenses can be reduced. It is obvious that it will cost less to maintain one head office and one set of general officers than to maintain a number of them. Moreover to transship frequently always involves extra trouble and expense. Even with interchange of rolling stock, there is still that trouble and cost of duplicate or multifarious accounting and checking which are indispensable when there are separate administrations.

By consolidation some companies were able to reduce their working expenses to about three fifths of their former amount. In fact, it is generally acknowledged that it is largely by such consolidations that the American and British railways have been able to pay so well as they have during the last two decades. Indeed, it should require no special training to see the advantage

and necessity of such consolidation. If one turns to our own railways, we find most of the so-called big lines have only about 600 miles of single track, while many of the other lines are not even long enough to form a separate operating section or district in other countries; and for each of these short lines we have to maintain a separate head office with all its directors, managers, and sometimes *parasites*, etc. This is one of the chief reasons why, in America, the general expenses of the big companies amount only to about 4% of the total operating expenses, while those of our railways average about 10%. The direct losses due to the payment of salaries and expenses are small when compared with the losses due to the lack of efficiency in management and waste in operation. Without going into any detail, it is safe to say that the number of our railway head offices could be reduced to half its number for economic purposes. Of course there are the difficulties resulting from the loan agreements, which make such a consolidation hard. But such difficulties should not prevent us from aiming at the right direction; and every little achieved is so much gained. Therefore, I wish to repeat that consolidation of administration is most important.

To Push the Lines under Construction with Speed and to Adopt a Program for the Future

We believe in pushing the unfinished lines rapidly, because every delay, no matter what is the cause, means so much waste of money. The engineers, etc., will have to be paid, the staff and establishment will have to be maintained, whether or not construction is proceeding. Besides other losses, we have also to make up for the loss of interest on the proceeds from the sale of our bonds. On every dollar of bond we sell we have to begin at once to pay at least 5% interest, but such proceeds, when put in the foreign banks pending the time to be spent in construction, only brings to us a return as current deposit of about 2 or 3%, thus we lose two or three per cent outright. Take the Hukuang lines as an example; we are losing every day some \$4,000, for the delay. If the construction is delayed one year, it means that we would lose about \$1,500,000; if delayed ten years, \$15,000,000 will disappear.

In this connection, we may add that we should not begin the engagement of any directors, engineers, etc., until our bonds are sold. Otherwise, we shall have to support these employees and their establishments with money out of the "advances" made by the loan agents, even doing nothing pending the flotation of the loan. In some cases, we may lose hundreds of thousands of dollars by waiting, and find ourselves in a very embarrassing position, when the "advances" promised by the banks are exhausted, and the European market is too dull to permit the flotation of our bonds. Under such circumstances, we will find ourselves at a great disadvantage with the loan syndicates in our negotiations.

For the foregoing and other reasons, we urge that a general survey of the important trunk lines be first made by experienced engineers, and a careful program for the concessioning and construction of future railways be worked out, so as to separate the nonproductive periods of the various lines and to push the more remunerative lines first, in conformity with our financial capability. Unless such a careful program is followed and proper preparations made for meeting our increased obligations and multiplying expenditures, all our present buoyant hopes of direct gains and indirect benefits will prove a dangerous illusion, the fear of an international commission will become a reality, and this otherwise beneficial railway expansion will become the cause of our dissolution. This is our situation, and to meet it constitutes our task.

To Administer the Railways as a Business Enterprise

To avoid the disaster of any approaching railway collapse, administration of the railways according to business principles is essential. Other railway nations not only have been taught by experience to treat railways as a commercial enterprise and to separate railway finance from other finances, but many have also seen fit to set aside a part of the Government's revenue

from ordinary sources as capital and reserve for the construction, safeguard, and upkeep of their railways. As direct earnings from railways are often insufficient to meet their expenses and interest charges, this precaution has proved not only advantageous but in many cases necessary.

Railways Should Pool Interests

Now railways are not native products of China, but an imported institution. The experience of other nations must obtain in our case. Consequently, in introducing railways, we may well adopt similar safeguards which have been found necessary elsewhere, by setting aside a certain adequate part of the government revenue to meet railway deficits. In so far as all such revenue of the Government is earmarked, and hence cannot be in reality set aside to meet railway demands, the only thing left is to let the railways take care of themselves by permitting them to pool their interests, so to speak, so that what one line loses may be made up by the gains of another and *vice versa*; and part of the surplus of good years may be reserved for the deficit of the bad years. Thus the railways may effect a sort of mutual insurance against each other's losses and non-productive periods, as we have illustrated in the case of the family. Failing to face this necessity by continuing to take the last cent away from the lines that pay and neglect the needs of those that do not, or to take away all the profits of the good years and ignore the losses of the bad years, this would be a suicidal policy.

Many lines operated by private companies have been "milked," to use the exact word, for temporary purposes, at the expense of the prosperity of the lines. The same thing may be done with governmental lines at the expense of the nation. By this process of milking, railway "profit" may be swelled up for a number of years by misappropriating railway capital. For instance, the Government or shareholders may reduce operating expenses to a minimum, and regard all that is left as profit, which they immediately take away from the railway. So far as railway business is concerned, the maintenance and other expenses may be reduced far beyond what is proper during a number of years, without much serious appearance. Necessary improvements may also be neglected. In the meantime, capital investment may be taken away as profit, as we have illustrated elsewhere in the case of locomotives, rails, rolling stock, etc. Such practices are most dangerous.

To avoid this disaster, it is urged that railway finance should be planned out for a long period and properly balanced, so that railway earnings can be devoted first to meet both present and future railway demands. Provisions should also be made to meet all deficits.

Distasteful but Urgent Reform

This may, indeed, be a very distasteful reform to make at this point when the nation's finances are in such a stringent state. But it is indispensable if we want to safeguard the future and to bring about efficiency in railway administration. Like a surgical operation, it hurts while taking place, but without it, it is more dangerous. A few months ago, when the country was disturbed by a revolution, we would not advocate this measure for fear that such a suggestion might be taken advantage of by irresponsible parties to embarrass the Government. In fact, this paper was prepared in 1912 and was amplified in September, 1913, when the writer was investigating the administration of the Swiss railways; but on account of the second revolution, the depredations of the bandit White Wolf, etc., it has been kept until now when constructive work must soon begin. As it is time to consolidate, and plans for the long run must be made, this reform is urgent.

By this separation, it is not meant that railway receipts should be hoarded up while the Government goes borrowing, but rather that the needs of the railroads should receive due consideration, and that a "living" allowance be granted, so as to prevent them from bankruptcy, or being handicapped by the lack of equipment for handling their business, while surpluses can be turned over to the Government through proper channels. That is, the Government should recognize more clearly the

railways as a separate business and its own position as that of the shareholder. The business should be managed on a business basis and should be permitted to plan as to how to meet its needs and to carry out its improvements with its resources, while the Government should only take the dividends after such needs are properly met.

What has hurt the railway credit most during recent years, perhaps, is the fact that the central administration has not been placed in a position to survey the whole situation and make due preparations beforehand, as a result of which spasmodic or "frenzied" financing had to be resorted to in the form of short term loans at greatly sacrificing rates of interest or discount. Railway finance is a science. Special attention should be paid to this branch of railway administration, the success of which should begin with the complete discarding of joggling and the adoption of a definite policy with an absolutely pure and honest administration.

It is accepted as a general rule that sound finance must be preceded by clear records and proper accounting, where each item of revenue and expense is properly accounted for. Unless the Government is bold enough to face the situation squarely, to put all financial matters aboveboard, to introduce proper accounting, and to subject every item of revenue and expense to an impartial control and effective audit, not only our railways will run into collapse, but our nation will get into bankruptcy. It is up to the Government to get its most reliable and properly qualified men, and give them enough power to control all revenues and expenses, so that a proper survey of the financial situation may be made, that every dollar will figure in the books, and that every figure will represent true facts. If the officers lower down should be subjected to proper control, the officers higher up must be prepared to honor such control first. This applies not only to railways, but to other branches of administration as well.

To Encourage Honesty

The last but by no means the least important step, which we propose, is to adopt a system that will encourage honesty and improve efficiency of the railway service. And that system is to admit new employees by effective and impartial examination, to insure permanency and to award promotions on the merit of service.

Squeezing and other forms of corruption among railway men have been often reported in China. We are not in a position to say how much truth there is in these reports; but we are certain that in the absence of fire there can hardly be so much smoke. What we propose now is to stop squeezing among railway men; and we believe we can do it.

In order to stop squeezing among railway men, we must, first of all, find out what are the real causes of that evil practice. I may state from the outset that squeezing and corruption in general among our railway men are by no means due to the lack of honesty or business capacity of our people. Indeed, after staying in Europe and America nine years, and having made much special study as to the underlying causes of squeezing at home and elsewhere, I am convinced that our people, on the whole, compare favorably with other peoples, so far as honesty and capacity for business are concerned. What is wrong at the bottom of it all seems to lie partly in our lack of experience with the new order of things, but largely in our lack of a proper system to encourage honesty and efficiency. Given an efficient system and a reasonable amount of time to become adapted in the administration of railways or any other business, our people, I firmly believe, will be just as honest and efficient as any other people in the world, plus a great deal of hope to be better.

Our lack of system to encourage honesty, although often overlooked by ourselves, has been most glaring in the eyes of others. In the first place, after these long years we have not yet evolved any system for the selection of young men into the railway service. We have not yet opened the door of our railway service to all competitors. Consequently the posts in the railways, such as that of clerks, guards, conductors, station masters, inspectors, etc., may often be filled by irregular means, chief among which is "pull." As a result, men of little education

or ability, or even men of doubtful character, have often entered into the service and held responsible positions. With such men to begin with, good results can hardly be expected.

The evils of the "pull" system are too numerous to enumerate. In so far as one can get into the service through the pull, or his "protectors," or his party, he can easily manage to stay in and practice corruption in defiance of his superiors, for he knows that so long as his protectors remain in power, their overshadowing influence will be enough to protect him from punishment for his rascality. Not only is he unfit for the work, but he also rejects discipline. He is perfectly conscious that the tenure of his post depends upon the influence of his protectors. When the latter are in power, he feels safe, no matter what happens; when that power weakens, off he also goes. There were many cases where men had been suddenly appointed to fill important positions and dismissed equally summarily for no other reason than the rise or fall of their relatives or friends. Such men can seldom be expected to render efficient service. Even if the immediate superiors should wish to enforce discipline, they would often be prevented from so doing by the fear of such protectors' revenge, to say nothing of those who would be too ready to make use of such occasions for putting themselves on good terms with such influential men. We cannot blame these immediate superiors, for we have not any definite protection for those who wish to do right at the risk of offending their superiors. It is reported that in the past some station masters absconded with large sums of money without punishment. Should we look into the records of these men, we could be sure that they were "recommended into" the railway service by men higher up.

Favoritism and Its Dangers

In short, this lack of system for the selection of proper men for the railway service encourages the filling of posts by a series of favoritisms. The high officials, political parties, members of Parliament, and other influential men would incline to appoint their protégés as directors, managers, and other important functionaries; these in turn would tend to appoint their relatives and friends to secondary posts, such as assistants, inspectors, station masters, etc., and so on down the list. As a result, it might happen that the important posts of a line may be filled mostly by men of a certain type, or a certain locality, irrespective of their ability and character. It is easy to see the serious disadvantages which are bound to result from such a practice, especially in the matter of inspection, control, and development, to say nothing of the injustice done to the men of other types or localities.* What is worse is that the absence of any adequate system might even lead to the sale of offices or to other forms of corruption.

Another cause of squeeze is the lack of certainty of service. The uncertainty of office in China has almost become proverbial. From the moment one enters the service, he never knows when he will be removed. This is true not only in the case of any one class of offices, but in that of all classes. Moreover, when one is discharged, there is little chance for him to get his case properly heard by any competent and impartial authority.

Take some of the railway directors, for instance; there have been many cases where they were not permitted to stay long enough even to learn their business. How then, could fundamental reforms be expected? This can well be illustrated by the case of the Peking-Mukden Railway, where we find the average term of office of the directors is but a little over ten months. The Tientsin-Pukow Railway has been open but a few years, and it is said that it has had more than a dozen different directors. Under such circumstances no man can expect to make any progress, for reforms in railway management, take time to decide and plan, to say nothing of carrying them out. Without sufficient time, no sane man would venture to make

any fundamental improvement; for, in making improvements, what is seen first is usually trouble, opposition, and even disturbance, while good results may not follow until years later. Furthermore, the directors, besides being uncertain about their terms of office, are sometimes equally ill informed as to what are their duties. The division of responsibility and power is often so uncertain that some of them had to devote most of their time and attention to quarrelling and scheming against each other, while others would simply draw their pay and do no work. The degenerating effect of such a state of affairs must be obvious.

Danger of Short Term Officials

Under such circumstances the director, who is the head of the railway and has to deal with foreigners, can never know as much as the foreigners whose posts are permanent. As he knows less than the foreigners, it is but natural that he cannot command the respect of the foreign employees, much less use them properly, to say nothing of other disadvantages. Moreover, when the permanent foreign employees, besides knowing all the details and history of the work, see that the Chinese directors are tossed about by their superiors, they gradually, and sometimes perhaps unwillingly, become insubordinate. A number of able foreign employees had to be discharged on account of some such troubles; but the fault may lie just as much in the way in which the foreign employees were gradually led to become insubordinate as in the employees themselves. Unless this state of affairs is improved no man can expect to produce lasting good results. This is too long a story to tell in this paper, but suffice it to say that *so long as we allow the important offices of railways to be made political rewards to be filled by favoritism or partisanship so long we shall not have any directors and managers that can do the business properly.* What Mr. Dalrymple, the Manager of the Glasgow Tramways, said in regard to the Chicago railways is equally true in our case. Namely, it is hopeless to think of operating the railroads efficiently so long as the officers were appointed for short terms from political motives.

In regard to the other classes of employees, it is a well-known fact that not many young men enter the railway service with the idea of remaining for any length of time. It is the lack of certainty, more than anything else, that prevents the railway employees from looking upon their service as a lifelong career, and it is this attitude of the employees that tends to promote squeezing.

Then there is the lack of any system for the promotion of the men lower down. Here again "pull" often works greater wonders than merit. This fact tends to influence the men to feel that it makes little difference whether they do their work well or not. The fact that they see with their own eyes that some of their comrades sometimes actually get rich quickly with immunity, and that still others who can get quicker promotion through "pull" than through merit,—all these facts must prove demoralizing.

Urges Civil Service

It is these lacks in the system of railway service that lead to most of the evil practices as circulated about. *Given a strict system of examination for selecting duly qualified young men to begin with and a carefully defined career of service together with a properly organized system of rewards and punishments, the railways will be able to get the best type of young men of the country to flock into their doors.* With such duly qualified men to start with and a regular career laid out, honesty and efficiency will come with time. For it must have been noticed by many observers that the average Chinese capitalizes certainty of service and a sure future more highly than, perhaps, most other peoples. Take a station master for example, if he has to pass a hard competitive examination and several years' service to get his position, he will naturally value his position very highly. To this, when we add the feeling that so long as he discharges his duties honestly and diligently, he is sure of his job, with a pay that enables him to live comfortably, and a reasonable amount of hope for promotion, the average young

* President Hadley of Yale University said that one of the causes of the failure of the Italian railways was due to the fact that each line was officered by men from one locality, which practice tended to limit the power of judgment in the development of business. Hadley Railway Transportation, 1903, p. 222.

men are not going to risk such realities by courting any temporary gains which, at any moment, may not only deprive him of his safe income and position but also bring about criminal punishment. The result of the customs and postal services are examples as to how the average Chinese young men attach more value to certainty than to other gains. It is repeatedly heard that men in those services would prefer a much smaller salary than to go elsewhere for bigger salaries, simply because they know they are safe in the service so long as they do their work well. Similar reports are often heard regarding the attitude of men in other lines of work.

The railway service can be made even more attractive, for it is a more interesting service, which pays well for the amount of knowledge that is required and the amount of work to be done. It indeed can be made into the most attractive service in the country, to which the best talent will flock. With some impartial system of examination to bar out unqualified men and an effective system of service and reward, we can eliminate squeezing from the railway service or at least reduce it to a minimum.

"Squeeze" and Its Results

My emphasis of the importance of stopping squeeze will perhaps meet with criticism from many directions. On several occasions I have heard very enlightened men make slighting remarks of the efforts exerted for stopping squeezing. According to them, the important question is not to waste any energy in stopping squeeze but to devote every effort to the increase of earnings, so that the squeeze will be more than neutralized. It is claimed that so long as a railway gets plenty of traffic and earning through the employees, what is the difference whether or not some small amounts of money is squeezed by the employees. At first there seems to be considerable practical sense in this view; but after several years of observation, I conclude that I must take a totally different view from it. In the first place, what we advocate is not merely passive, but side by side with that measure the active result of increased earnings will take place. Moreover, we claim that a railway cannot get the largest earnings by countenancing squeeze. On the contrary, experience shows that best results can only be obtained through honest service. Human nature is such that when a man practices corruption, he is bound to devote his best time, best efforts, as well as his best brains, to perfecting his private schemes and to attend to his best legitimate duties afterwards. Hence it is out of the question to get the best results from him, to say nothing of the demoralizing effects which he produces all around.

It may be further pointed out that what the railway suffers is far worse than the amount of money which such men may squeeze. Indeed what is squeezed by the employees constitutes only a small fraction of what the railway loses. Take a passenger for example; if a guard gets one dollar from him, his fare is likely to be three or four times that much. In the case of goods, the proportion will be still greater. What is the harm done to shippers or passengers. It is heard that merchants often find themselves entirely helpless at the hand of station agents. Unless the hands of these agents are properly greased, all sorts of trouble may arise. Cars may not be promptly switched, wagons may be sidetracked, movements may be delayed, goods may be spoiled, pilfered, or even burned on the way. So the merchants are constantly held under awe and threatened to pay squeezes, whereby not only to avoid such calamities but to have his goods shipped at reduced rates and under weights. It is also these underhanded evils that call for the wiping out of squeeze.

To Train Up Experts*

The steps which we have just outlined will not only stop squeezing, important as that is, but will also help to train up experts. It will have the positive effect of improving the whole railway service.

Experience has shown everywhere that railways must be managed by experts. The problems of railway administration are so numerous, the effects so far-reaching, the organization and working so complex, that it is only experts that may be able to develop the railways properly. It may be generally said that one of the greatest needs of the railways in China is expert service. A few facts may help to show the needs.

We all know that in dealing with foreigners, we have lost in many cases in the matter of railways. This perhaps was not due so much to the aggression of our foreign friends as it was to the fact that they were experts while we were not. They knew what they talked about, but we sometimes did not. When our layman representatives, who had no intimate knowledge, met the foreign experts who knew every corner of the question, it might have been expected that our men lost out.

It is due to the same lack of experts in China that we have to employ many foreigners in our railway service at a great cost. The fact that we have had considerable trouble in dealing with some of our foreign employees may be traced to the same cause. To ameliorate the situation we must first of all train up our own experts. Otherwise, any attempt to relieve our foreign assistants will be suicidal. In fact, we need more real foreign experts selected by ourselves for special work, who should be willing to work disinterestedly for the country and ready to afford our young men every opportunity to learn. By this process, in a few years, we shall have our own experts. But the fundamental requirement for training up our own experts under our foreign employees or under any other system is that there must first of all be adopted an impartial and effective system for selecting the young men to begin with, a fair protection against the influence of the politicians and cliques, and a stable and well defined service that will permit the men to work long enough to learn the business.

Great Expectations of Government

In conclusion it may be added that there has been a wrong conception of railway finance in China. Both the Government and the public seem to think that railways are gold mines, built for making enormous profits. What is more dangerous is the feeling or belief that every line, no matter where it is located and how it is constructed or managed, will yield enormous surpluses. They have seen the fabulous earnings of the Peking-Mukden and the Peking-Hankow lines. Therefore, they think all other lines will do likewise. Apparently the Government thinks that the railways are not only going to pay all the expenses and interest on bonds as well as the annual quota on the redemption of the principal of the loans: over and above these—which is clearly beyond the earning power of the railways—large amounts of money are to be taken out from them as net surpluses every year. What is worse is the reported inclination of political parties and high officials to exploit the railways for party or private ends. To say that this is fraught with danger is to put it mildly. It is hoped that the foregoing pages may at least create enough interest in the administration and finances of railways so that the whole railway question may receive due attention before it is too late.

MAY GROW RUBBER IN HAINAN

Through the enterprise of a Chinese merchant, China may become a producer of plantation rubber. At the time of the rubber boom a syndicate owning large rubber properties in the Straits Settlements sent an expert to China to investigate the possibilities in regard to rubber growing. The expert traveled in Kuangtung, Yunnan, and the Yangtze provinces and reported that the climate and soil were unfavorable. Since then nothing more on the subject has been heard, until the other day, when Mr. Liu Yi-shun, an overseas Chinese merchant, made a proposition to the Government. He regards Hainan as good rubber country, and has asked for the right to commence operations there. Apparently he has been granted a free site of some half million acres, and has been urged to invest his money in his mother country. Local officials have been ordered to render him any assistance, and the President has personally encouraged him.

*Vide China Needs Experts and How to Get Them, FAR EASTERN REVIEW, Feb., 1915.

Products of China for Export Trade

IN the October issue of the Far Eastern Review some of the many products of China and resources that might be turned to use for the assistance of China's allies were discussed. This article was necessarily incomplete for most of 300 odd schedules of the Customs' export statistics enter into consumption for war purposes in some measure or other, and to set forth all of them with any detail would fill many numbers of the magazine. In this and succeeding issue the series will be continued until the major portion of the more important articles of export commerce of China are covered.

China's Cotton Products

[BY H. H. JOBSON, AGRONOMIST TO TEXAS EXPERIMENT STATIONS, ON LEAVE AS COTTON EXPERT TO THE CHINESE GOVERNMENT]

When considering the advantages which she is to gain by entering the present world-wide war, China should not overlook the greater opportunities afforded to develop her cotton industry. There are many factors involved in her present status as a cotton producing and manufacturing nation about which there is little or no definite information available. However, any one who takes the trouble to investigate this question, even in a very superficial manner, can readily see that although China has had greater opportunities for developing this industry for the past twenty years than any other nation, these opportunities have presented themselves much more clearly within recent months.

If China ever expects to make a serious effort to take her place among the other nations of the world as a cotton producer and manufacturer, she will never find a more appropriate time than the present, when other nations are bending all of their resources in men and materials to the prosecution of the war. The shortage of labor in America, the scarcity of shipping facilities, and all other factors which go to put cotton at the highest price it has reached since the American Civil War conditions adjusted themselves to normal, should act as an incentive to the Chinese Government and the farming classes in the cotton growing districts, to put forth every effort to encourage and enlarge the industry while conditions are so extremely favorable.

This industry cannot be developed to a high state of efficiency in one, two, or even five years. However, by seriously taking hold of the fundamental problems involved and handling them in a modern, systematic manner instead of making a half-hearted attempt to work out some of the greater or less unimportant phases of the work, China could be in a position to

take her place among the other cotton producing nations within a reasonably short period of time.

Conditions are such that great strides could be made in the development of both the production and the manufacture of cotton. Production could and should outstrip manufacture in the early stages of development.

In promoting production the Government should take it on itself to take charge of all pioneer work. These efforts could

best be prosecuted through a well-organized system of experiment stations placed under one directing head, and intelligently located. Such stations should be so well organized that all superintendents would be absolutely dependent on the directing head for all projects, as well as the manner in which they should be carried out. Any superintendent should, of course, receive permission to investigate any important problem which might be local to his station, but the problem should be attacked by means of a well-outlined project which had received the approval of the directing head. A very important factor in the establishment of a system of experiment stations is their location. In order to make the greatest progress possible from

the very beginning of the work, the stations should be established in the most favorable cotton growing regions, which, in the case of China, is the zone of the Yangtze River, or even farther south where the season is sufficiently long for the later maturing varieties. Early varieties will do as well where the season is long enough for the late maturing varieties as they will where the season is shorter.

The work of these stations should be confined, at first, to the more fundamental problems, such as the introduction of

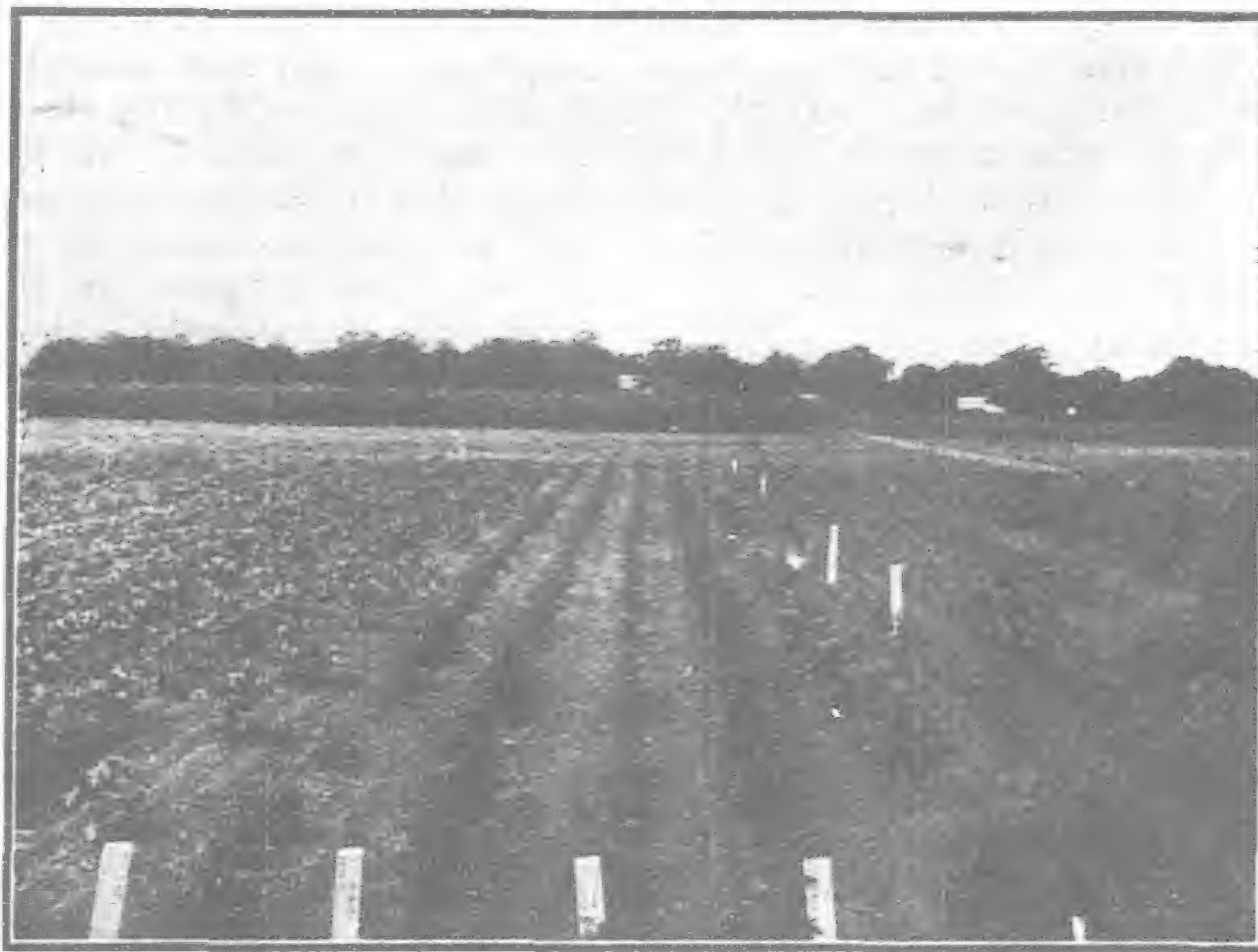


Photo by H. H. Jobson.
CHINESE COTTON INCLUDED IN A VARIETY TEST ON THE TEXAS EXPERIMENT STATIONS. WHEN PLANTED LIKE AMERICAN COTTON THIS COTTON PRODUCED FROM 25 TO 30 BOLLS PER STALK AS AGAINST HALF THE NUMBER ACCORDING TO CHINESE METHODS

new varieties, the improvement of the native varieties, and the introduction and modification of foreign methods, as well as the improvement of the native methods.

The advantages to be gained from the introduction of American varieties are two fold. There is no doubt but what they could be made to produce greater yields than the native varieties in many localities, while by far the more important advantage is that they would produce a fiber of much greater length and value.

The Chinese varieties on an average produce a fiber which runs about five eighths of an inch or slightly over in length, while even the short staple upland varieties of America produce a staple that runs from seven eighths to one and one eighth inches in length of fiber.

If there are any doubts as to whether or not American varieties can be produced or grown successfully under Chinese conditions, the Ministry of Agriculture and Commerce has sufficient evidence to allay those doubts. This evidence, although secured in a few very limited localities, will apply to a very large portion of the cotton growing region of China.

There are some conditions where the native varieties will probably give greater returns than American or other foreign varieties, as cotton is grown over a much larger area of latitude than is the case in America.

Advantages of Introducing American Varieties

As an insight into what can be expected of American varieties under Chinese conditions, the cotton now growing in the Zoological Gardens near Peking furnishes a splendid example. This cotton—particularly that which has been selected for a year or so—has something like thirty bolls per stalk that are absolutely normal in size, and show every evidence of being sufficiently mature to open before the cold weather sets in, in spite of the fact that it is a long staple variety grown in a locality where the season is so short that under ordinary conditions a short staple variety could not be expected to produce a profitable crop. This cotton has been topped, and all growing buds removed, otherwise it might not have put on much fruit, but would have produced an abnormally large stalk at the expense of fruit. Topping is not resorted to in America, as conditions are such as to make it unnecessary except in extremely wet seasons, and then there is not sufficient labor available.

The fact that a variety gives good returns the first year it is tried out, should not cause the experiment stations to distribute it among the farmers and discontinue all efforts to improve it. That it does give good results the first time it is tried should cause the experiment stations to double their efforts with it in order to improve it to such an extent that it may be thoroughly acclimated and bred up to the highest point of efficiency.

The improvement of the native varieties is a factor which is just about as important as the introduction of new varieties, although it would require a considerable time to breed them up to a point where they would compare favorably with American varieties in yield and length of fiber.

There are some conditions in the cotton growing region where, in all probability, the American varieties will not yield as much as the native varieties, and it is in these sections that the native cotton should be improved. It is not a difficult matter to breed up a variety of cotton to a high state of efficiency, provided the work is carried out intelligently, particularly so when the crop is in such a backward or degenerate state as is the case with the Chinese varieties. It does, however, require a reasonable period of time. Some of the more simple methods of selection applied to the more promising Chinese varieties for a few seasons would give surprisingly good results.

The Improvement of Native Methods

The problem of improving the native methods and introducing and modifying foreign methods should be carefully worked out on experiment stations before being introduced among the farmers. There are some changes, however, which all principles governing modern agriculture indicate would be successful

right from the very beginning, and might be tried out on a limited basis among the cotton farmers. One of the more important of these is the preparation of the seed bed. In many cases, the Chinese farmers have the surface of their seed beds in a splendid condition, though they are not prepared deep enough for cotton. It must be remembered that cotton is a tap-rooted plant, that is, it has one primary tap root which penetrates vertically into the soil, sometimes to a depth of two feet or more, and feeds from a greater depth than the grains and other surface feeders.

Another important factor is the rate of seeding. Very close planting such as is practiced by the Chinese farmers, is permissible where the season is extremely short, and where it is necessary to force the plants to put on a crop in a minimum length of time. Under more favorable conditions the plant must be given more space to develop fruiting limbs as well as fruit. Fruit, or bolls, are borne on fruiting limbs, and if the plants are too close together at least some of these fruiting limbs will be suppressed, thereby making it impossible for the plants to produce a maximum amount of fruit. The proper distance apart for plants depends on the variety involved, the fertility of the soil, and the seasonal conditions, and cannot be determined definitely without being worked out experimentally. There are many other factors involved in the improvement of the native methods and the introduction and modification of foreign methods which might be discussed here, but in most cases they are such as should be worked out on an experiment station before being introduced among the farmers.

The conditions as they exist on the farms of China to-day cannot be blamed entirely on the Chinese farmers. In any country, the average farmer is a man of more or less limited means and cannot afford to experiment with new crops or ideas. The Chinese farmer, as well as any other, will not hesitate very long about taking up a new variety or method after he has been shown conclusively that it will yield him greater returns than the variety or method he is planting or using, provided his finances will permit the change. The Government should take upon itself the duty of conducting all experimental work, and not ask the farmer to change his methods or crop until it has been proved conclusively, at the expense of the Government, that the change will net him greater returns.

The same facts that apply to production will also apply to the development of the cotton mill industry, as all pioneer work has been done with very little or no assistance from the Government. Instead of taking the lead in the development of this industry, it has lagged, and has even been charged with throwing obstacles in the way of progress.

Cotton Manufacture in China

Cotton manufacture in China by means of modern methods is of comparatively recent origin. In the year 1896 there were only twelve mills in the country,—nine at Shanghai, and one each at Wuchang, Ningpo, and Soochow. The total number of spindles and looms in operation at that time were 417,000 and 2,100 respectively. According to the survey of the cotton goods industry of this country by Mr. Odell in 1915, there were at that time thirty-one mills in operation, with 1,008,986 spindles and 4,564 looms aside from a considerable number of spindles and looms building at that time. The mills as listed by Mr. Odell, are as follows:

NAME OF MILL	LOCATION	SPINDLES	LOOMS
Ewo Cotton Spinning and Weaving Co. (Ltd.)	Shanghai	73,952	524
Laou Kung Mow Cotton Spinning and Weaving Co. (Ltd.)	"	40,096	
Soy Chee Cotton Spinning Co. (Ltd.)	"	50,768	
Kung Yik Cotton Spinning and Weaving Co. (Ltd.)	"	23,376	400
International Cotton Mfg. Co. (Ltd.)	"	53,200	500
Yangtzepoo Cotton Mfg. Co. (Ltd.)	"	55,632	
Shanghai Cotton Mfg. Co. (Ltd.)	"	45,872	886
Naigai Wata Cotton Mill	"	110,000	
Chin Zung Cotton Mill	"	10,080	

San Sing Cotton Mill	Shanghai	65,420	600
Heng Foong Cotton Mfg. Co. ..	"	15,576	354
Yue Yuen Cotton Mill	"	26,936	
Yue Tung Cotton Mill	"	18,200	300
Anglo-Chinese Cotton Mfg. Co. ..	"	13,200	
Dong Chong Cotton Mill	"	11,200	
Teh Dah Cotton Mill	"	10,368	
Ho Feng Cotton Mill	Ningpo	23,200	
Tung Chiu Yuan Cotton S. & W. Co.	"	17,000	200
Hupei Government Cotton Weaving Mill	Wuchang	90,000	800
Soo Loong Cotton Spinning Co. ..	Soochow	22,520	
Yih Ching Cotton Spinning Co. ..	Wusieh	14,000	
Chung Sing Cotton Spinning Co. ..	"	30,000	
Tung Yih Kong Cotton Spinning Co.	Hangchow	20,060	
Tung Wai Kung Cotton Spinning Co.	Shoh San	12,000	
Tah Sung Cotton Spinning Co. ..	Tungchow	40,250	
Tah Sung Cotton Mill No. 2 ..	Tsungming	26,000	
Chi Tai Cotton Spinning Co. ..	Tiachong	13,200	
Lee Yung Cotton Spinning Co. ..	Kiangkin	16,000	
Yue Tai Cotton Mill	Shiangszio	11,880	
Kwong Yih Spinning Mill	Changtefu	32,000	
Yue Foong Cotton Mill	Tse Dong	15,000	
Total		1,006,986	4,564

Thus it will be seen that the number of spindles have almost tripled and the number of looms more than doubled between 1896 and 1915, with little or no assistance or encouragement, but in some cases actual interference in the way of unfavorable taxation by the Government.

If China had encouraged this industry as Japan has done for the last twenty or thirty years it would be on a basis comparable with that of any other cotton manufacturing country. One of the controlling factors of the industry is an ample supply of labor at a fairly reasonable price, and labor is one of China's chief resources, greater than that of any other nation, with the possible exception of Japan or India. Even under existing conditions there are foreign interests looking over the situation from time to time with the idea of establishing mills here provided conditions are found favorable. No longer ago than last spring the cotton manufacturing interests of the eastern United States had representatives in China making a survey of conditions with the possible intention of establishing mills, provided conditions were favorable. The Government should make every effort to encourage new capital, and at least put her own mills on a fair basis with those of foreign countries.

The total cotton goods imported into China in 1915 were valued at Hk. Tls. 150,004,210, while in 1916 they totaled Tls. 136,679,386.

Cotton goods exported in 1915 totaled in value Taels 3,160,036, and in 1916, Tls. 3,838,544.

Raw cotton to the value of Tls. 13,700,496 was exported in 1915, and Tls. 17,091,073 in 1916, while cotton waste exported was valued at Tls. 340,784 in 1915 and Tls. 536,007 in 1916.

Tin

Tin mining in China is mostly confined to the province of Yunnan, though some is produced in south Hunan and Kwangsi provinces, and the output is estimated to be about six per cent of the world's supply. In 1912 the export from Yunnan was 9,222 tons valued at Gold \$8,428,600; in 1913 it was 8,552 tons valued at \$7,654,050. These were normal times so far as world conditions are concerned, but since the outbreak of war the export has somewhat decreased, for one reason because of the lack of shipping facilities.

Crippling Taxation

The industry, so far as Yunnan is concerned, is one which is greatly handicapped by official impositions and general disregard of the national advantages accruing from a policy of

fostering mining enterprises in particular and industries in general. In the Kotchiu district of Yunnan, where the bulk of the tin is won, there are two kinds of taxes levied to which the attention of the Government was directed in 1914 by Mr. V. K. Ting, the able Director of the Geological Survey of China, and to which the attention of the Government is again called in the hope that the investigations made by Mr. Ting will now be consummated by definite action making for substantial relief. One tax is levied on every 2,500 catties of tin regardless of the price or quality of the products, and amounts to \$122, and the other is a levy made for railway construction purposes of £50 on every 2,500 catties (or "sheet," as 2,500 catties is locally called) for the projected Yunnan-Szechwan Railway, and \$50 on every six piculs of concentrate for the railway from the mines at Kotchiu to the Yunnan-Indo-China Railway, a length of some 30 or 40 miles. As six piculs of concentrates yield approximately 2,500 catties of tin, every "sheet" has to pay about \$120 as railway shares, the total tax thus being something like \$240, or about 10 per cent of the gross value of tin, taking the pre-war price of \$1,600 per ton. The recommendation made by Mr. Ting was that the tax should be according to the market value of the product. At the outbreak of the war in August, 1914, the price of tin fell by some 50%, the tax thus amounting to nearly 18% of the value, with the result that from 50 to 60 per cent of the miners were made bankrupt. Nor, as Mr. Ting



LINWU TIN MINES

pointed out, was this all. Most of the tin mines produce lead ores, and though the value of this lead tin is much lower than pure tin, there is no differentiation made in the method of taxation between pure tin and lead tin—all being \$250 per 2,500 catties. The mines that have produced mixed tin have had consequently to close down. If the tax was varied to suit the changing market prices of tin and alloy, Mr. Ting suggests, not only could the tin mines continue to work when the price of tin falls, but the tin and lead alloy might also become an important product of the province.

With regard to the tax for railway shares, Mr. Ting advises that this be abolished, since no effort has been made to build the railway to Szechwan, and the money obtained from the tax has been loaned out at interest. So far as the short line to the main railway is concerned it will cost, with economy, only about \$3,000,000, and this amount has been fully subscribed. To continue the tax is therefore but to continue the burden of the miners unnecessarily.

Another hardship that should be remedied is that imposed by the compulsory transportation of all tin ore to the Customs station at Kotchiu city before it can be smelted. This order was imposed with the object of preventing smuggling, and came into effect before the railway was built into Yunnan. All ores have thus to be taken to Kotchiu city, a hardship which can be appreciated when it is stated that ores from Kiashihlung, where charcoal is abundant, must be transported, together with the charcoal, a distance of some 30 miles, and mostly by pack mules or ponies. Now that the railway exists, smuggling can be just as easily frustrated by establishing the Customs station

at Pishihtsai station, where all tin must pass whether for consumption at home or abroad. Mining in distant districts would thus be encouraged by rendering unnecessary the expenses contingent upon the transport of crude ore and charcoal.

The Kotchiu Tin District

The ore at Kotchiu is contained mainly in a residual clay formed by decalcification (more or less superficial) of limestone, and can be concentrated by repeated washing. Mr. Ting explains, and so far as the ore is concerned can be quite effectively treated by native methods. These methods have, however, several defects, these being, he says, (1) lack of water for washing during the winter and spring, the output therefore being dependent on the rainfall; (2) the quantity of charcoal used is excessive, thus causing a high cost of production and deforestation; (3) the impurities in the tin thus produced, and the lack of uniformity in quality, even from the same tapping, preventing the tin from being directly sold on the foreign market. All such tin is now smelted in Hongkong.

Realizing the above defects the officials of Yunnan in 1909 formed the Kotchiu Tin Mining Company, and purchased smelting furnaces, ore dressing plant, and constructed an



PE CHI-CHAI, THE STATION FOR MENGZIE

be worked with profit for four or five months of the year. The native process of washing this low grade ore is somewhat similar to the modern hydraulic method. It is accomplished by digging trenches before the time for the big rains. The average ditch is from one third of a mile to a mile in length with sufficient slope to cause a gentle pressure. This first washing reduces the ore to from five to forty per cent tin.

The shaft ore runs from two to twenty per cent tin. Since this ore requires much less water, this branch of the industry may be carried on for six months of the year.

The Nahak'eh District is a tract belonging to the Yunnan Tin Trading Company. It is about four miles from Kotchiu, and covers an area of about eight miles in circumference. In this region both rock and decomposed ore are found in paying quantities. The water supply here is even more meager than in the Huang-Moa Shan district, hence the proportional product is for the present less. Several other localities in this section of Yunnan yield tin, notably the Ka-Fan and the Shih-Ba districts.

The Kotchiu Company's Plant

The Yunnan Tin Trading Company conducts an entirely modern ore dressing plant and smelting work at Kotchiu. The ore dressing plant contains five trammels for first washing of low grade ore, two ball mills with four gigs each, for grinding coarse ore, one large tube mill for grinding the finer ore, fifty-two washing tables of three models—the Wilfley, the Ferraris, and the Drue Vanner—and twelve hydraulic classifiers. Small quantities of rock ore are being handled by the ball mills.

The smelting works contain three gas generators, supporting six reverberatory furnaces, three refiners and one blast furnace for handling slag. Each furnace has a capacity of four tons of ore per charge, each charge of course being mixed with sand and charcoal in proper parts according to the grade of ore. The average requires eighteen hours or from twelve to thirty hours, according to the grade of coal and to the purity of the ore.



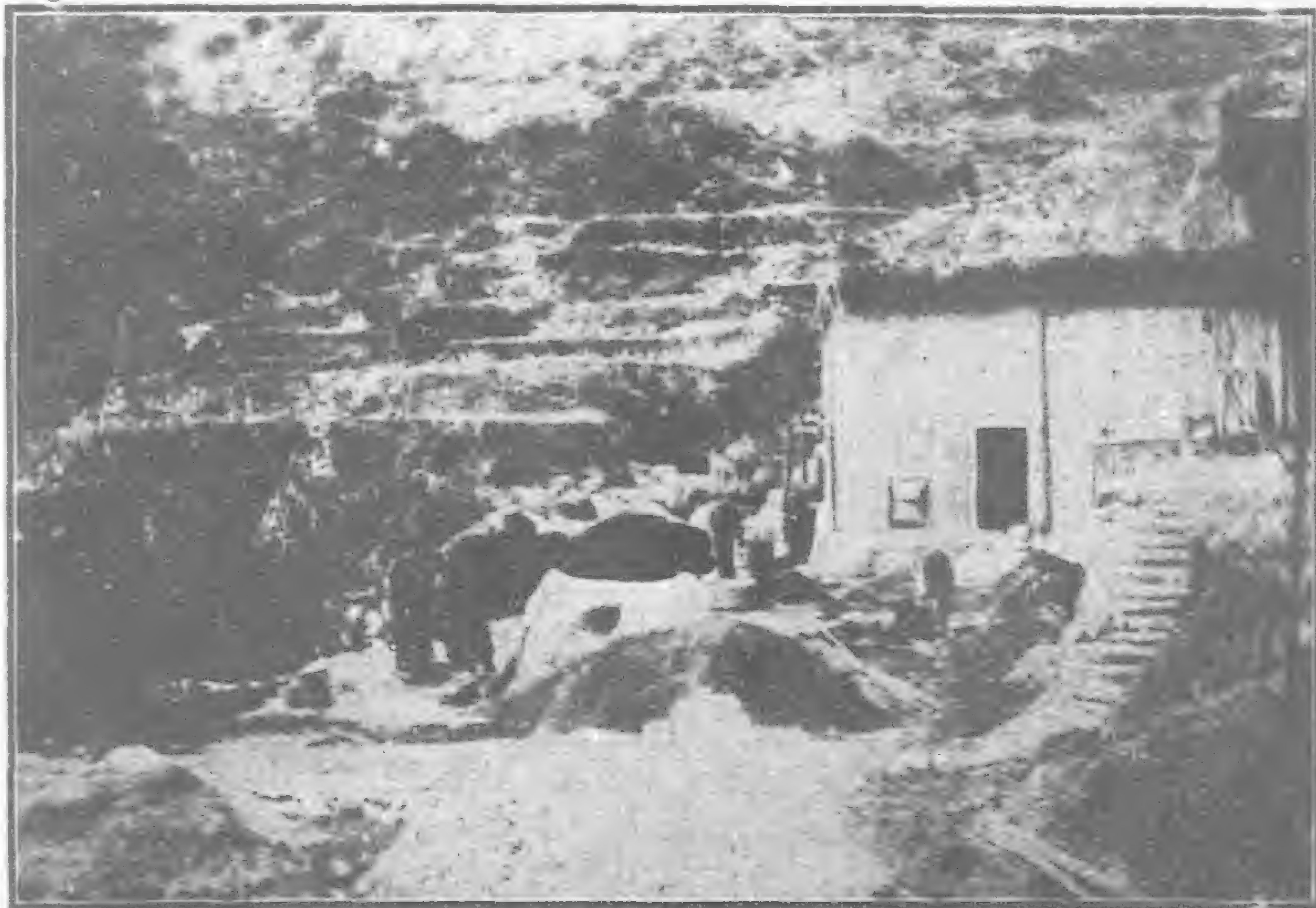
BRINGING SHAB TIN TO MARKET

aerial ropeway for transporting the mined ores to the concentrating plant at Kochiu, and also adopted coal gas to minimize cost. Bad management interfered for a long time with proper development until by 1914 the capital expenditure in the plant was \$1,600,000, and the total capital some \$3,300,000, most of the working capital being lost within the first six years of operation. About \$2,500,000 of the total capital State money.

In 1916 Mr. Frank K. Pilson, of Yunnanfu, visited the mines, and wrote the following description of them:

The Huanghoashan tract is the best known of the tin districts in Yunnan. It is about thirteen to twenty miles in circumference taking Kotchiu as the approximate center. The deposits are what is usually designated as decomposed or sand ore, that is, composed of alluvial deposit and decomposed rock. Not much rock ore has been excavated although it exists in many localities. These deposits have been worked by the primitive Chinese methods for upward of two hundred years. Not a vertical shaft exists in the region. Where the natives have gone below the surface they have burrowed in irregular tunnels close to the top or skirting the sides of the hills.

The annual output of the Kotchiu district is from six to seven thousand tons (tin) removed entirely by native methods. The surface ore is from one thousandth to four thousandths part tin to ore. This comprises about three tenths of the whole Kotchiu output and because of the poor grade requires a large amount of water for washing. The rainy season rarely lasts more than three months and for lack of artificial means of conserving the water supply, surface ore can only



ORE DRESSING FLOOR AT YUTUNG TIN MINES

The Shuikoshan Zinc and Lead Mine

[BY A. S. WHEELER AND S. Y. LI, A.R.S.M.]

The mineral production of China, excluding iron and coal, is the aggregate resulting from numerous small mines of the type that can probably be best described as "native workings." The "wholesale system" in mining has never yet been practised, and there are, at the present time, no mines under Chinese control in any way comparable to the big or even moderate sized producers of other countries. The majority of these small mines keep no proper records of either outputs or costs, while from those that do it is not often that a detailed statement of costs can be prepared, or is procurable. Judging by our experience in visiting and examining mines in various parts of the country, the average mine manager possesses no technical qualifications or experience fitting him for his post; he rarely ventures underground or is conversant with the details of the treatment process, while his ideas of output and costs are usually very hazy. The general lack of information on this all important subject is most deplorable; and the meagre amount that is available is quite inadequate as a basis on which any reliable estimates of costs could be framed or on which one can generalize.

operations were brought to a standstill owing to the difficulties and cost of working at depth, and in the 23rd year of Kuang Hsu (A.D. 1897), during the late Empress Dowager's regime, the then Governor of Hunan, hearing of the mine, established what is practically the present Hunan Official Mining Board and re-started operations. It was soon realized, however, that if the venture was to be a success, native methods would have to be replaced by modern practice; consequently the present incline shaft was started with the object of modernizing the underground workings. In 1912 the mine was reorganized and the "foreign" dressing plant put in commission. The money for this was obtained by a loan from Messrs. Carlowitz & Co., of Hankow, under contract to sell to this firm the entire output, one-third of which was to be paid for on delivery and the balance taken in repayment of the loan, until fully redeemed. This contract is understood to have since been cancelled.

The mine is situated a few miles south of the Siang river in the Changninghsien, or magistracy, of the Hengchowfu, or prefecture, being 90 li (32 miles) south of Hengchow city. It



VIEW OF THE POWER HOUSE AND MAIN INCLINE SHAFT



VIEW SHOWING THE NEW MILL IN COURSE OF CONSTRUCTION

During the course of a tour of inspection in Hunan province, the authors had occasion to examine the Shuikoshan zinc and lead mine. This property, which is the largest and foremost of its kind in China, was found to be one of the very few where operating costs are recorded with any degree of accuracy, or in sufficient detail to permit of analysis. In preparing this account of it, our main object has been to give figures of cost of production which, although they cover only a brief period of four months, may prove of interest and value as a record.

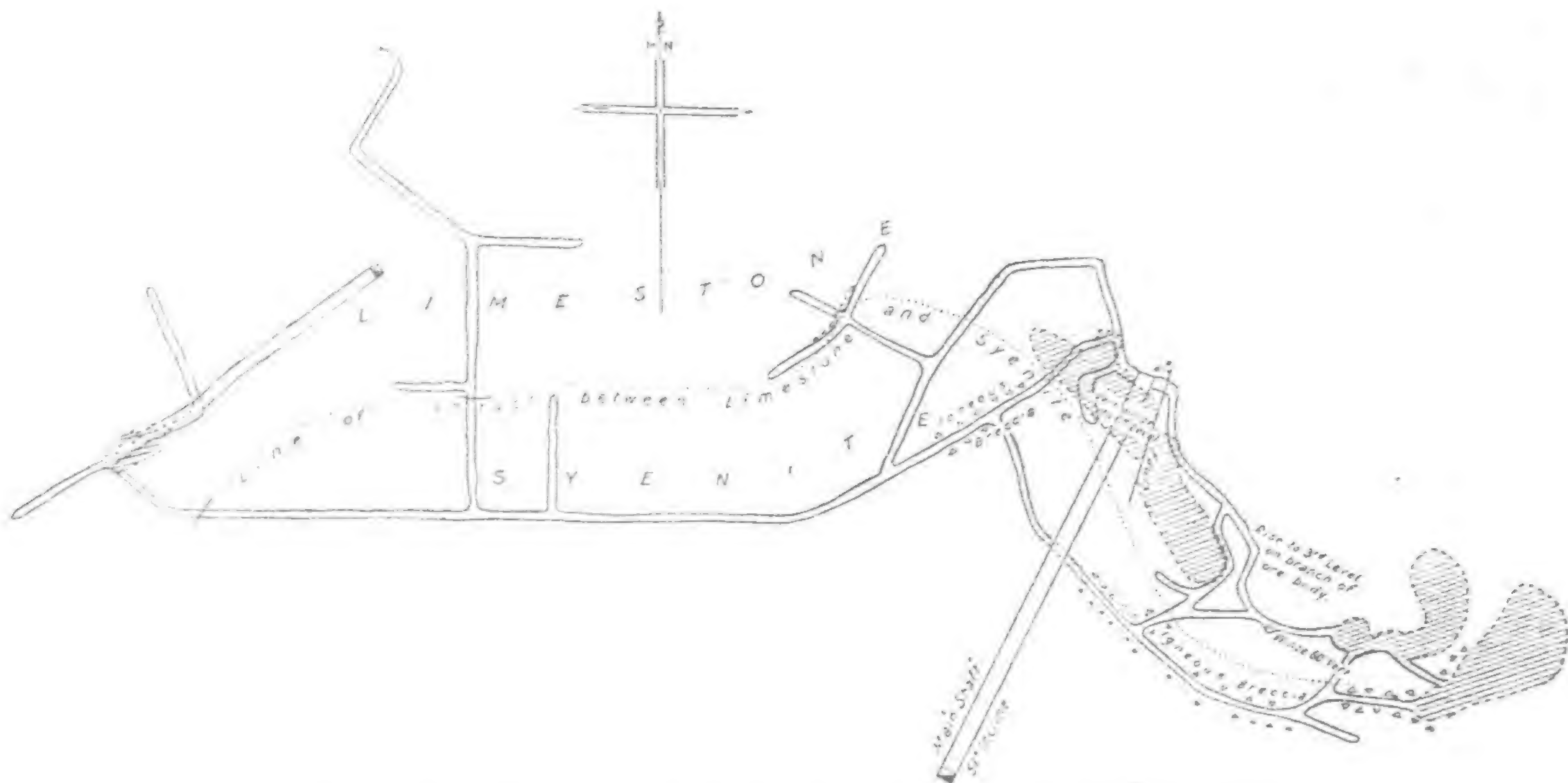
Hunan is one of the provinces of southern central China, and lies on the south side of that great artery of commerce, the Yangtze river, which forms a portion of its northern boundary. It is perhaps better equipped with navigable waterways than any other province of China, three rivers, the Siang, the Tze, and the Yuan, flowing through it, and all emptying into the Tung-ting lake which communicates with the Yangtze.

The Shuikoshan mine is owned by the Hunan Official Mining Board, and is practically their only profit-earning mining venture, carrying the burden of a number of other properties mostly operated at a loss. Existing records, the earliest of which date back to the latter end of the Ming dynasty (circa A.D. 1600), prove that the mine has been worked spasmodically for the past 300 years. Toward the close of the last century

is well placed as regards transport facilities. Between the village of Sung-po, which is the loading station on the Siang river, and Hengchow all river freight is junk-borne. From Hengchow to Changsha (155 miles) small Chinese owned launches are usually available. Between the treaty ports of Changsha, the capital of the province, and Hankow (250 miles), a regular service of river steamers, drawing from 5 to 6 ft. of water, is maintained, but has usually to be suspended during the low-water season, from about December to March, when only shallow-draught launches and Chinese junks can pass. Big river steamers run all the year round between Hankow and Shanghai (600 miles) and during the high-water months, May to September, ocean-going steamers can often proceed up the Yangtze to Hankow. An easy and cheap means of transport is therefore provided between the point of production and the seaboard, such as is not often available in this country.

From Sung-po a light railway runs 10½ li (3.8 miles) south to the mine. The track is built to 60 cm. gauge, with 20 lb. rails, and carries a full load of fifty tons, consisting of a train of fifteen trucks of concentrates plus engine; coal and general supplies are brought back on the return trips.

Geology.—The geological structure, though interesting, is not of an uncommon type, and, in its main features, is similar to many well known deposits. The ore carrier is limestone, of the



PLAN OF THE FOURTH LEVEL, SHOWING THE GEOLOGICAL FEATURES AND OREBODIES

series generally known as the "Great Limestone" formation, and is ascribed to the Paleozoic to Mesozoic periods. It is probable that this limestone may be classed as belonging to the Carboniferous era. Overlying this are red sandstones and shales of Cretaceous or Tertiary age. These cover the area to the north and west, while the limestone prevails on the south and east sides. The contact of the two series may be observed about 1½ (0.54 mile) north of the main incline shaft showing slight unconformity, the dip of the superimposed red sandstone being 50° E.N.E. as against 70° of the limestone. An eruption of syenite, apparently laccolitic in nature, has tilted both formations, producing an anticline, the crest of which has since been denuded, exposing the intrusive core and also an igneous breccia of limestone fragments resulting therefrom.

The occurrence consists of large irregular shaped bodies of ore composed of zinc blende and galena, with both iron and copper pyrites, developed in the limestone at or near the contact with the syenite. The chalcopyrite also occurs in the form of small crystals disseminated through the syenite and would appear to have formed an original constituent, while the deposit itself was the direct result of metasomatic action of the mineral-bearing solutions emanating from the magma. The presence of well marked slichensides and a crush conglomerate composed of ore and matrix testify to considerable subsequent pressure and movement. The igneous breccia which marks the line of contact, merging on the northeast side into limestone, and on the southwest into syenite, is quite distinct from the crush conglomerate.

The accompanying plan of the fourth level shows all these features clearly, and also the line of ore deposition, which roughly follows a curve from southeast to west. Prospecting was in progress at two other points in the vicinity, where the geological features are similar, but no big orebodies had been found.

Mine Workings.—The mine, which until 15 years ago had been worked entirely by primitive Chinese methods, was then reorganized and run on more or less modern lines. A main 3-compartment shaft, measuring 11 ft. 6 in. by 6 ft. 6 in. within timbers, was sunk at an angle of 51° through the old workings to a vertical depth of 500 ft., and four levels were driven at 290, 400, 440, and 500 ft. respectively. A vertical 10 ft. by 6 ft. 6 in. winze, sunk 164 ft. below the fourth level, serves the 5th and 6th levels, the latter being the bottom level.

There were still two native mines, one of which was worked through an opening connected with the main workings, the other being on a detached orebody on which work was temporarily suspended pending the sinking of a new vertical shaft, which had recently been started. This shaft measures 13 ft. 9 in. by 6 ft. 10 in., has three compartments, two for hoisting, and one for pump and ladder way.

Mine Costs.—We found that all work was done on contract as is usually the case on Chinese mines. Machines were not used for sinking, driving, or stoping, although a 60 h.p. compressor and twelve rock-drills formed part of the mechanical equipment.

Cost of Sinking Shaft

The prices paid per foot for sinking were:

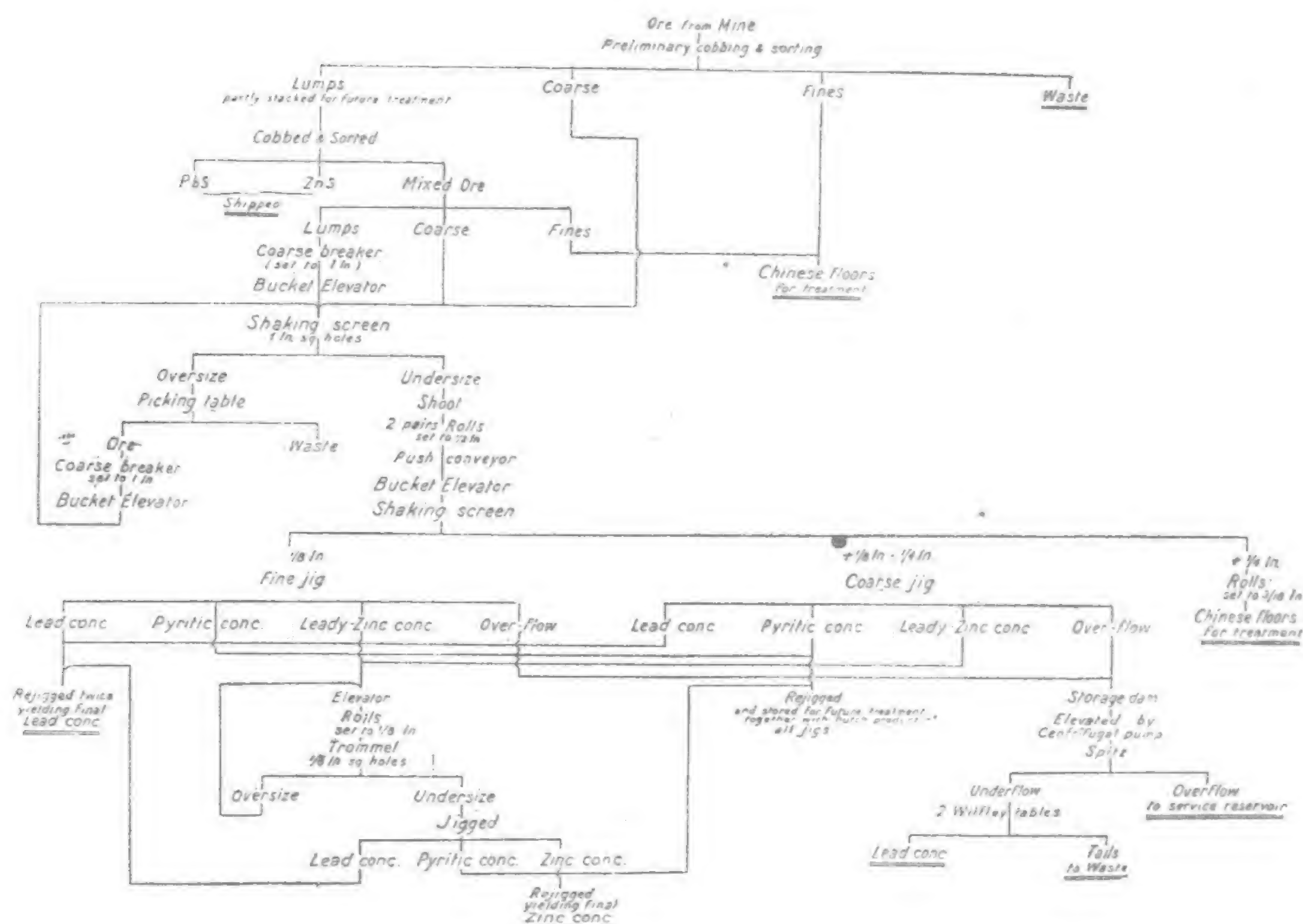
	Mexican	
	dollars	s. d.
New vertical shaft 15 ft. 6 in. by 8 ft. 6 in.,	10.05	16 9
Incline shaft 13 ft. by 8 ft.	8.87	14 9
Vertical winze 11 ft. 6 in. 8 ft.	8.87	14 9

The shaft setts were of 8 in. square imported pine, and the cost of fitting and fixing including lagging and ladders was given at 0.30 Mexican dollars (= 6d.) per foot of depth.

The contract prices for driving, 6 ft. 6 in by 6 ft. 6 in., were per foot advance:

	Mexican		
	Dollars	s. d.	s. d.
In syenite or breccia	4.14 to 5.33	6 11	to 8 10
In limestone	5.32 to 7.15	8 10	to 11 10
In tough limestone,	7.10 to 8.87	11 10	to 14 9

including tramping of ore to shaft or disposal of waste in old stopes. It may be mentioned here that the expenditure on development was kept very low. The Chinese do not appreciate the necessity of development, and it is rarely that any ore is held in reserve in a mine operated under Chinese control. The almost universal practice is to work out the ore as found, and hence when a poor zone is encountered the mine has to be closed down unless further capital is forthcoming. The Shuikoshan was, however, an exception to the rule, and the ore in sight in the mine together with the reserve at surface was about sufficient to supply the treatment plants then working for one year. Hand stopers were paid 36 cash per picul (= 9.13d. per ton) of rough sorted ore tramped to shaft; if the ore had to be carried up to the level a few cash extra were given. Whether sinking, driving, or stoping the contractor had to find his own powder, and could purchase food from the company at reduced rates; the company providing all other necessities. The explosive used was native-made black powder and cost \$0.133 per catty, or 2.02d. per lb. Ore carriers, in native workings, were paid 142 cash (being 82 cash as wages and 60 cash food allowance) for a minimum of 11 piculs of ore per 8-hour shift; this is equivalent to 2.12d. per 1,450 lb., or at the rate of 3.27d. per ton. For each additional picul 18 cash was paid; this in sterling equivalent is 0.27d. per 131.6 lb., or at the rate of 4.56d. per ton.



FLOW-SHEET AT THE MODERN DRESSING-PLANT AT SHUI-KO-SHAN MINE.

We found that there was little or no timbering in the stopes; the walls stood well and there had been a fortunate freedom from falls of ground in the old workings.

The following were the wages paid per shift:

Dollars and cents Shillings and pence

Pumpmen, working bamboo suction pumps in the native mine.....	24.25 to 53.35 c.	4.85 to 10.67d.
Surface coolies	11.64 c.	2.33d.
Ventilation (by windbox) men	24.25 c.	4.85d.
Carpenters and timbermen	19.4 to 33.95 c.	3.88 to 6.79d.
Masons.....	17.46 to 24.25 c.	3.49 to 4.88d.
Stokers	38.8 c.	7.76d.
Blacksmiths.....	48.5 c.	9.7d.
Fitters.....	\$0.485 to \$1.445	9.7d. to 2s. 5.1d.
Hoisting engine drivers	\$1.455	2s. 5.1d.

Eight-hour shifts were worked underground, and 10-hour at surface.

The labour force at the "foreign" mine totalled about 800, of whom one quarter were surface hands, including blacksmiths and mechanics. The native mine employed about one-tenth of this number. The average daily wage worked out rather over 20 cents (=4d).

The tonnages hoisted per month averaged 6,375, of which 5,497 came from the "foreign" mine.

The total mining cost per ton to the company was \$1.80 (=3s.) apportioned as follows:

	Mexican Dollars	s.	d.
<i>Wages:</i>			
Development.....	3.152		3.04
Stoping	0.457		9.14
All other work.....	0.232		4.64
<i>Mine supplies, excluding cost of timber and rails:.....</i>	0.659	1	1.18
<i>Prospecting:</i>	0.300		6.00
Total	\$1.800	3	0

Ore Treatment.—The hoisted ore was subjected to a preliminary cobbling and sorting, and at the same time classified into lumps, coarse, and fines. The lump ore was then cobbed and close-sorted, yielding clean galena and zinc-blende ready for

shipment. The sorting arrangements were very poor, which explained the relatively high cost per ton of this item. The ore was trammed from the shaft top and dumped in front of a big dimly-lit sorting shed, into which it was carried in baskets to be cobbed and close-sorted by boys. Portage from the shaft to sorting shed cost \$0.032 (=0.64d.) per ton. Cobbing and sorting was paid for at 13 cash per minimum of 55 catties of picked ore (=0.194d. for 72.5 lb., or at the rate of 6d. per ton), plus 80 cash (=1.19d.) food allowance. For each additional 5 catties, 5 cash extra was paid (=0.075d. for 6.6 lb. or at the rate of 2s. 1.4d. per ton). This hand-picked ore constituted more than half the total output.

The remaining lumps and coarse (+1/4 in.) were sent to the "foreign" dressing floors, and the fines to the Chinese floors. The flow-sheet on this page outlines the treatment process at the foreign dressing floors, and the figures in the table below show the normal range in grade of the concentrates produced.

Comparison of Methods

The results of mechanical and hand concentration, as we saw them, formed an interesting comparison. On the Chinese floors the ore was concentrated by hand-jigging in shallow baskets immersed in water. After a few pulsations, the operator gave the basket two or three short abrupt twists which brought the waste to the top. He skimmed this off with a scraper and repeated the process, rejecting an upper skimming of waste and throwing on to a heap a second skimming of mixed product. When sufficiently reduced, the concentrate was thrown out on to the earth floor and crushed by beating with a flail (precisely similar to our old fashioned corn thresher); it was then hand-jigged over again, yielding a final lead concentrate and a mixed product. The latter was similarly treated until the galena had been eliminated as far as possible, leaving a zinc concentrate. The tub sludge or sediment, which carried about 27% Pb and 13% Zn, was concentrated by repeated washings down a concave inclined plane built of stone and cement-faced. This process may be regarded as equivalent to puddling. The sludge was packed in a layer at the top of the plane, and the dresser, seated at the lower end, flicked up jets of water in rapid succession with a small bamboo scoop, washing down a little ore with each jet. The waste was carried down to the bottom of the plane or washed off, the concentrate settling higher up. When the whole layer had been thus treated, the heads were collected and the process repeated on the tails. The method was extremely crude,



MODEL OF MINE WHICH GAINED FAVOURABLE COMMENT AT PANAMA PACIFIC EXPOSITION

and more or less independent of the skill of the operator; the product could probably have been far better handled by the Wilfley.

With this exception the figures show that a rather higher degree of concentration was being obtained by the Chinese hand methods than by the mechanical appliances in use.

The capacity of the "foreign" plant, at 50 tons per day, was slightly in excess of that of the Chinese floors. A new plant, designed to handle 100 tons daily, was in course of erection at the time of our visit, and has since been put in commission.

	LEAD CONCENTRATE			ZINC CONCENTRATE		
	Pb %	Zn %	Ag Oz. per Ton	Zn %	Pb %	Ag Oz. per Ton
Picked or..	67 to 73	under 5	17 to 30	38 to 53	2.5	up to 4
Jigs	65 to 75	7	20 to 37	24 to 28	7 to 15	up to 13
Wilfleys ..	71 to 79	5	29 to 38	—	—	—
Chinese floors:						
Fines..	56	11	9 to 12	26 to 36	5 to 13	4 to 24
Coarse .	67 to 75	7	21 to 25			

Middlings from jigs stored for future treatment averaged about 16% Pb and 16% Zn; and the tailings about 3% Pb and 8% Zn.

Tonnage and Output

The figures of tonnage of ore treated and output during the period under review are:—

	Tons
Average tonnage treated per month.....	5,483
Average output of concentrates per month....	2,274

Details of Concentrates:	Lead	Zinc
Hand picked	334	961
"Foreign" plant	123	418
Chinese floors.....	100	338

Totals 557 1,717

The cost of treatment was: per ton of ore treated \$1.05 (=1s. 9d.); per ton of concentrates produced \$2.53 (=4s. 2'6d.); of this latter figure \$2'15 (=3s. 7d.) was paid in wages and food. Attendants in the foreign plant, of whom there were

three each 10-hour shift, were paid from \$1.40 to \$2.00 (=2s. 4d. to 3s. 4d.) per shift.

Accounts kept in more detail during one month showed the following costs per ton of dressed ore.

Produced by:

Hand-picking.....	\$2.25	(=3s. 9d.)
"Foreign" plant	\$1.10	(=1s. 10d.)
Chinese floors	\$3.30	(=5s. 6d.)

These figures do not include staff salaries, repairs, or power, and it is not possible to segregate these items from the accounts, though they are included in the subsequent figures given of total running costs.

Transport.—Transport costs worked out at \$1.272 (=2s. 1.44d.) per ton of concentrates produced, and were made up as follows:

Railage from mine to Sung-po 3 8 miles	\$0.313	(=6.20d.)
Loading and unloading cars	0.090	(=1.80d.)
Loading boats.....	0.045	(=0.90d.)
River freightage Sung-po to Changsha (185 miles)	0.827	(=1s. 4.54d.)

\$1.272 (=2s. 1.44d.)

There were no loading facilities at Sung-po; the concentrates were tipped from the trucks, shovelled into baskets, and carried by coolies down the river bank to the junks, which conveyed them to Changsha, where Carlowitz & Co. took delivery.

Mechanical Equipment.—Steam power was used throughout, and the boiler plant, consisting of four Babcock & Wilcox boilers, was generating about 600 h.p., burning a medium quality bituminous coal, mined in the vicinity and costing \$6.30 (=10s. 6d.) per ton delivered. The monthly consumption averaged 1,500 tons, which figure included a certain amount used for domestic purposes. Semi-anthracite was obtainable from the Ping-hsiang colliery, situated in Kiang-si province, and connected by rail with Chüchow, which lies on the Siang river 28 miles south of Changsha, at a cost of \$8.75 per ton delivered, which included \$1 freight charges. A little was used very occasionally in the small suction-gas plant, which served as an auxiliary drive for the electric lighting installation.

The mine was well equipped with engineering shops for pattern-making, moulding, fitting, and boiler making. Castings

up to one ton weight were turned out, and steam engines and pumps were excellently made here under the direction of a most capable Chinese mechanical engineer, at about two-thirds of what the imported cost would have been; in fact half the machinery for the new plant was being made on the mine.

Summary of Costs.—The administration was divided into two main departments: (1) general; (2) engineering. The former included general management and transport; the latter covered mining, prospecting, ore-dressing, assaying, surveying, and mechanical work.

The accounts were kept under the following headings and sub-headings:

HEADING	SUB-HEADING
Staff Salaries and Office Wages	Salaries of Manager and Assistant. Salaries of Officials (67 in number, ranging from \$16 to \$500 per month). Wages and food of office servants and bodyguard.
General Office expenses	Stationery. Postage and telegrams. Sundry office items. Miscellaneous (mostly loss on rice supplied to employees).
Engineering	Mine Police (about 70 strong). Mine labour (all underground workers). Mine supplies (timber, rails, steel, fuel, etc.) Prospecting. Ore-dressing (wages, food, supplies). Transport (railage and river freight from mine to Changsha). Mechanical. Railway (maintenance and repairs). Repairs to buildings.
Erection and Purchase of Property	New dressing plant. Properties brought.
Miscellaneous Special	Miscellaneous. Gratuities, bonuses, and compensation for injuries. Apprentices and workshop expenses.

The figures thus given have been analysed and segregated as far as possible to cover the various items of cost, and may be summarized thus:

PERIOD—FOUR MONTHS.		COST PER TON	
		Ore Treated	Concentrates produced
	\$ (Mex.) s. d.	\$ (Mex.) s. d.	
Mining.....	1.80* 3 0*	5.03 8 4.6	
Ore-dressing ..	1.05 1 9	2.53 4 2.6	
Transport	0.53 0 10.6	1.27 2 1.4	
Mechanical	0.29 0 5.8	0.69 1 1.9	
Fuel	1.72 2 10.4	4.16 6 11.1	
Office	0.87 1 5.4	2.11 3 6.1	
Sundry.....	0.64 1 0.8	1.55 2 7.0	
Total.....	6'90 116'0	17'34 2810'7	

All new machinery or plant, other than made on the mine, and supplies such as timber, rails, &c., were purchased through the head office in Changsha, and do not figure in these costs; nor has any allowance been made for depreciation, &c. These additions would bring up the total cost per ton of concentrates to fully \$20 or 33s. 4d.

Output.—The official records show that, from 1896 to 1912 inclusive, the mine had produced a total of:

Zinc concentrate.....	100,683 tons
Lead concentrate.....	41,837 tons

*Cost per ton mined has been taken, as balance was stacked for future treatment.

The pyrite in the ore was formerly collected and subjected to a process of roasting for its sulphur content, but this was stopped in 1914.

The full returns for 1913 and 1914 were as follows:

	1913	1914
Tons hoisted.....	42,570	64,474
Tons treated	46,037	55,087
Zinc concentrate.....	10,959	14,420
Proportion of picked ore in zinc concentrate	61.4%	58%
Lead concentrate.....	3,358	4,977
Proportion of picked ore in lead concentrate	50.4%	57%

Note.—For conversion from Chinese to British, the following equivalents have been used:

1 Chinese li.....	= 0.358 mile.
100 catties	= 1 picul.
17 piculs	= 1 ton of 2,240 lb.
1 Hunan dollar	= 1,500 "paper" cash.
"	= 1,300 copper cash.
"	= 0'97 Mexican dollar.
"	= 1s. 7.4d.
12 Mexican dollar	= £1 sterling.
1 " " "	= 1s. 8d.

Figures of cost refer to Mexican dollars unless otherwise stated.—*The Mining Magazine*

HOKKAIDO FOREST CONSERVATION

The Japanese Government is contemplating the conservation of forests or lumber resources in Hokkaido apparently with a view to a taining independence in shipbuilding, chemical and other industries after the war. Mr. Nakashoji, Minister of Agriculture and Commerce, says that the Government will put forests in Hokkaido under the direct control of the central administration instead of entrusting their management to the local administration as at present. This change will be made on the strength of the investigations made during his extensive tour there some time ago. As one of the after-war measures the Japanese Government will try to establish a firm policy for the betterment of forest management and fully back up the efforts of the navy, shipbuilders, chemical men. The State control of forests in Hokkaido is planned because they are the most important ones in the whole empire and now are in need of systematic management. In his opinion this step if taken will prove not only a good thing for the industries of the empire but a stimulus for the development of the Hokkaido.

JAPANESE PLANTERS IN BORNEO

According to the Japanese papers Japanese enterprises in the Borneo are making steady progress. As regards rubber plantations, recently the Mitsubishi Company acquired the lease of 1,500 acres in North Borneo and Mr. Kulhara has also obtained a lease of 2,800 acres. Mr. Kulhara is also reported to have applied for 25,000 acres in North Bornea. In Sarawak, the Suzuki Shoten, of Kobe, has already acquired two estates—one of 2,000 acres and another of 1,000 acres. Messrs. Endo Takac. Urabe Jofu, and others are now engaged in the promotion of a rubber-manufacturing company, named the Daito Gomei Kaisha, in British Borneo, with a capital of Y. 5,000,000.

Turning to the sugar industry it will be observed that the Shokusan Seizo Kaisha has already been incorporated and its sister concern, the Nanyo Sangyo Kaisha, is now engaged in buying up small sugar mills in Dutch Borneo. The establishment of a sugar company in Sumatra with a capital of Y. 6,000,000, to be called the Nanyo Seito Kaisha, is now in course of promotion. A number of Japanese are also carrying on petroleum, mining and other enterprises in British and Dutch Borneo.

The New China and Modern Industry and Commerce*

[BY JULEAN H. ARNOLD U. S. COMMERCIAL ATTACHE]

Why speak of the New China? What is there about China to-day that differentiates it from the China of yesterday? There are natives as well as foreigners living in China who fail to note any difference in the China of to-day over that of yesterday. It is true, to the casual observer, China of to-day is not very different from China of yesterday. A few miles of railways, a few factories, a few modern schools, seem to be the only visible evidences of a New China. The masses in China are still engaged in agriculture and with methods not different from those in vogue five hundred years ago. The great bulk of industry in China is still of the crude household sort. Transportation for the most part still follows the methods of the pre-railway age. The small shop and individual enterprise still rule in commercial circles. A very large percentage of the children are still without educational facilities, and the central government is still lacking in a constructive policy aimed at furthering the development of the country and its industries. With this gloomy picture, why then speak of the New China?

It is not in what China actually has done toward modernizing her country that justifies the appellation. It is what has taken place in the minds and hearts of the people which warrants our speaking of China of to-day as the New China. The more substantial evidences of this change in mind and heart are:

- (1) The abolition in 1906 of the old form of civil service examination based upon the classics, which opened the doors of China to modern education.
- (2) The anti-opium crusade.
- (3) The revolution of 1911 with its subsequent persistent demands for a representative constitutional government.
- (4) The development of the native press.
- (5) The growth of a national spirit.

The Necessity of Education

Of all of these factors, none carry with it greater significance than the development of modern education, for after all, the hopes for the future in any country lie in its public schools. If you would put your fingers on the pulse of a nation, understand its educational aspirations.

A stereotyped inelastic system of education over a period of many centuries, casting the intellect of the nation in a mold and robbing it of all initiative; the long isolation of China from the rest of the world; the general *laissez* policy of the government; the lack of the development of group activity; and the absence of aristocracy—all these, combined with the vastness of the territory and the immensity of its population, contribute to make difficult the transition of China from a medieval to a modern economic industrial society. Many marvel over Japan's rapid developments along modern lines over a period of comparatively few

years, and unfavorably contrast China's slower growth. They fail to consider Japan's advantages to a hastening of the transition in being a small compact unit accustomed to group activity in her feudal state and with an aristocracy to set the standard and the pace for the larger unit.

So China should be taken more in the sense of the historical perspective if we would judge rightly of her position and developments. Judged in this spirit the nation is undergoing marvelous changes with bright prospects for the future. The Chinese people possess all the potentialities of the more advanced civilizations. Patience, sympathy, and kindly coöperation on the part of the rest of the world are what China needs from without to make her transition a substantial contributing factor to the sum total of modern civilization.

Industry and Commerce Important Factors

Modern industry and commerce will come to play an important part in the life of the New China. In fact, they, with modern agriculture, will constitute the pillars of this new structure, resting as it were on the foundation of a progressive system of public instruction. Modern industry and commerce means the factory, the railway, and the laboratory. Household industry is giving away to organized industrial plants. The one man or one family enterprise is being supplanted by the modern business corporation. The camel caravan, the cart, and the junk are being superseded by the railway and the power boat, and chemistry and science are coming to China's assistance in developing and conserving her resources in products and in men, but all, only too slowly.

When we make the statement, "household industry is giving way to organized industrial plants," it is difficult for the human mind to conceive of the vast changes which this is going to mean in a country of the size and population of China. Stop a moment and think of a modern industrial nation in the sense of the U. S. but with 3 to 4 times its population. The developments necessary to bring this about are too

stupendous for the mind to grasp. The one great underlying idea in connection with this development is "organization"—organization of labor, capital, materials, and supervision. Likewise, to replace the individual business enterprise in China, which must be done to make possible the development of modern industry and commerce, the idea of organization again looms big before our eyes. One cannot conceive of a network of railways and fleets of ocean going-steamers necessary to the handling of the commerce that modern industrial developments and modern agricultural methods will necessitate, without facing again the need of organization in all its ramifications.

There is still another factor upon which all these depend for their success, one grand coördinating unit without which but little progress can be made, and this is constructive governmental administration. Modern industry, corporate business, modern transportation facilities, and



MR. JULEAN H. ARNOLD

* (Address delivered before the Industrial Conference of the Chinese Ministry of Education.)

constructive government administration are each and every one prime essential factors to the whole, and behind them all, necessary to success, lies organization.

What Organization Means

You have only to look to America to note the significance of organization to its industrial and commercial growth. The word "organization" stands out in bold relief in the American atmosphere. The habit of organization now so strongly engrained in the masses of people accounts in a very large way for the prompt and effective manner in which America is becoming a factor in this war.

Webster defines organization as the systematic union of individuals in a body whose officers, agents and members work together for a common end. In this definition all depends on the objective. The common end must be constructive and productive. The Chinese guild is an organization, and in many ways an effective organization, but it lacks in a constructive common end. In China, the guild finds its greatest service through the uncertainty in the application of public law. It takes on a protective rather than a constructive junction.

The fact that China silk might through slight changes in the method of preparation find a market in the United States threefold greater than the quantity now exported, is a subject which scarcely concerns the China silk guilds under their present organization. Yet it takes but little imagination to appreciate the potentialities for constructive work in this particular for an organization of silk men. The fact that China tea has been ousted from the markets of Great Britain where it once had its most lucrative trade does not concern the tea guilds, although China teas are recognized by the experts as possessing more delicate flavor than those produced elsewhere. Not only has China tea been displaced in a large way in markets abroad, but foreign teas are actually coming to China in increasingly larger quantities each year. During 1915 China imported \$5,000,000 worth of foreign teas. I have ridden on Chinese government railways in China and been told when I asked for China tea, that Ceylon tea only was obtainable. Organization of a constructive nature in the tea industry in China might easily lead to the doubling of China's exports of this product, which originated, along with silk, in China.

The leading imports into China, to-day, are cotton goods and cotton yarn. China can produce many fold the amount of cotton now raised. With her cheap industrious labor, she can produce cotton goods cheaper than they can be produced anywhere else in the world, and with one of the richest distributing markets in her own country, she can profitably market it almost without limit. But here again organization is needed—organization on the part of the government to help the growers by securing good seeds and expert advice, to encourage the manufacturers by removing obstacles such as taxes on native raw materials; organization on the part of the manufacturers to produce the capital and labor necessary to the modern textile mill; and organization on the part of the sales agencies to effect an economic distribution of the products manufactured. A splendid start has been made in China in cotton manufacturing, but much indeed must be done by way of organization in the government, itself and among the various interests in the industry, to encourage the developments in any way commensurate with the marvelous potentialities which this industry possesses. Probably no other industry in China lends itself to greater development possibilities than does cotton.

Modern Industrial Development

In manufacturing industries requiring the use of complicated machinery and skilled labor, organization is found in a more complex form. In developing modern industries in China, much money will be spent in experimentations, wasted in a sense, in learning how to avoid mistakes. The mere purchase of machinery and the erection of a plant does not mean modern industry. A trained business organization to superintend the securing of raw materials, the economic handling of the labor utilized in the industry and the marketing of the products are not the erection of a day. The assembling of labor and the education of this labor to handle efficiently the machinery new to it, and probably machinery of a delicate nature, are not to be accomplished in a month or in a year.

We see all over China to-day costly monuments to folly, by way of modern industrial plants, beautifully equipped, but through lack of proper nursing during their babyhood, killed. Mr. Carnegie, America's great philanthropist, said that he made his money by knowing how to use other peoples' brains. In introducing modern industries into China, the Chinese should learn how best to use the brains of those who have demonstrated their abilities to make a success of that industry until such time as their own men are trained to be able to take over work. Not only should expert management and labor be secured in the inauguration of a new industry, but the assistance of outside capital as well. The rapid development of modern industry in the United States is due in a large measure to the freedom accorded foreign capital and labor in enterprise in the United States. Naturally, in securing foreign capital and foreign expert assistance, great care must be exercised to safeguard for the Chinese people their, natural and inalienable rights to their own resources. Too often, in the past, have Chinese in authority parted, for a small consideration, with assets, the loss of which have sadly handicapped future developments in that direction for the whole Chinese people. Some of China's foreign railway agreements are of this nature. This war has shown the value of iron and steel to modern civilization. Iron is so important to a country of to-day that we may almost consider it as its life blood. China should safeguard her wealth in iron ore as a father safeguards the welfare of his son.

In trade and commerce, corporate enterprise must be developed. An effective machinery of law and courts, to be relied upon to interpret and apply the law justly and expeditiously, are necessary to native corporate enterprise in China. Chinese mercantile organizations such as chambers of commerce, should be encouraged by the Central Government and such other means, as effective, actively to interest themselves in constructive endeavor. Standardization of goods, standardization of weights and measures, and standardization of currency are essentials to the development of trade and commerce in China. These are questions which should concern Chinese chambers of commerce, and concern them to such an extent that they would force upon their government action in these matters in a way helpful to the crying needs of the country.

A simple illustration of lack of standardization where its presence could have meant much is given in the rug industry of north China. This industry might have made for itself a big and lasting place in the American market in the absence of supplies from Turkey and Persia bringing tens of millions of dollars in trade to China. But for lack of standardization in product, its future abroad is very uncertain. Many Chinese products could find far more extensive market possibilities abroad if only they could be depended upon, to be of uniform quality, that is standardized, so that foreign buyers could know with definiteness what they were buying. The necessity for standardization in weights and measures and in currency are so patent to all that I need not dwell on this subject here.

Good Roads Essential

Roads, railways, and steamships are all necessary to a country in the development of its commerce. China is poorer in these three to-day than most of the rest of the world, although enjoying a territory larger than that of the United States and a population three and one half times as great; yet where in China are we to find good roads? Good roads are essential to the collection and distribution of products, especially so in an agricultural country such as China. America's railway mileage could encircle the earth eleven times, while that of China is not sufficient to span the gap between Peking and San Francisco. Away from waterways in China, we find native methods of transportation ten to twenty times as costly as railway transportation in the United States where labor is twenty to thirty times as dear. Without a mercantile marine China is dreadfully handicapped in the development of her foreign trade. Being a cheap producing country, foreign trade should spell big opportunities for China. Had China a mercantile marine during the present war situation, her foreign trade would have reached three and four fold the present figures and the country could on that account be entirely free from foreign debt—in fact, be to-day a creditor nation. It is because Japan had a mercantile marine capable of meeting her needs that she arose from a debtor to a creditor nation during this war. Ships, ships, ships are sadly

needed to China, and yet the Chinese chambers of commerce and the Chinese Government show little interest in this important matter. Here again we have lack of organization for constructive ends.

The foreign concerns and interests in China are furnishing an ever present useful demonstration of organization. China's foreign business has been developed almost in its entirety by foreign firms. Few, indeed, even to this day, are the native concerns in China which are a factor in direct foreign trade. China really owes her foreign trade development to foreign enterprise.

How to Develop Modern Organization

Thus, in their final analysis, modern industry and commerce are largely a matter of organization. At least, organization is a prime essential. How is China to develop the modern organization idea? Firstly, through example and encouragement from the government. The inauguration, for instance, of effective scientific organization in the work of the Ministry of Agriculture and Commerce would do marvels not only for the labors of this important ministry in the development of the industries of the country, but serve also as a model to all other lines of activity in China, now suffering because of lack of modern organization.

Secondly, by education. Modern industry and commerce in China must find its foundation in education. Education in China is still a thing apart from industry and commerce. The educational ideals of the past are responsible for the stagnation of to-day. The tendency to write essays rather than to translate knowledge into action is still very strong with the Chinese people. Education in the New China needs scientific organization for a common constructive end. It must by precept and by curricula instill the ideas of modern organization into the masses of people. It must, to be effective, get down to the real tangible needs of the people and the country. As in the Philippine Islands, it must inculcate in the minds of the younger generations, the dignity of labor. It must concern itself with the preparation of the people for the upbuilding of agriculture, industry, and commerce.

Through education, the farmers of the New China must learn to understand the value of deep plowing and afforestation to the prevention of floods, scientific seed selection, animal breeding, the significance of good roads and rural banks and better methods of marketing. Through education, the people of the New China must learn to understand the value and use of machinery, chemistry and science in their applications to modern industry, and to appreciate the fact that the factory brings its problems in labor organization, sanitation, scientific management, and corporate enterprise. Through education the people of the New China must learn to realize the necessity of standardization of currency, of weights and measures, and of products, to the development of commerce. They must learn to appreciate the impossibility of commercial and industrial development with usurious rates of interest, with the family system carried into the office and factory, and with lack of government and community encouragement. Chambers of commerce and mercantile organizations must learn to function constructively. Scientific business administration must be given a cordial welcome in native enterprise.

Hence the new education in China must shape itself so as to meet the needs of the people. It should not be confined by any means to schools. The lectures, platform demonstrations, moving picture films, the native press, etc., should all be drafted into service in the cause of the new education. As for school education, the old idea of training students to write essays should give way to training students for action. The New China must be the China of action rather than the China of essays. Probably nowhere else in the world has a system of public instruction so well adapted itself to the real needs of a people than has the system now in vogue in the Philippine Islands. It would be well for Chinese educationalists interested in developing in China a system of education devised to prepare the Chinese people for the industrial and commercial demands of the New China, to make a thorough study of this admirable system.

But all this requires organization. Organization is required to teach organization. The ideas of organization cannot be effectively instilled into the minds of the people of China and made part of their economic and industrial life, without organization. In whatever direction we may

move in this country, and in whatever line of activity or enterprise we may concern ourselves, we find ourselves confronted with the demand for organization; that is, organization in the modern sense of the word, organization with a constructive common end. The New China is receptive, and whole-heartedly receptive, to modern industry and commerce; but the New China needs to develop the capacity for effective organization, if it would make modern industry and commerce its own.

Beet-Sugar in Manchuria

Some ten years ago the Ashih-ho Sugar Company was organized by Russian businessmen, with a factory at Ashih-ho near Harbin on the Chinese Eastern Railway, but the industry has since made no appreciable progress, excepting for the establishment of the Hulan Sugar Administration by the Manchurian Provincial authorities. Meanwhile, several agricultural experimental stations have been experimenting on beet, and in 1914 the Kunchuling and Hsiungyocheng experimental farms attached to the South Manchuria Railway Company began the cultivation of this sugar producing root. In view of the successful results obtained, Japanese businessmen have recently organized a sugar company known at the Minami Manshu Seito Kaisha (South Manchuria Sugar Manufacturing Company), with a capital of 10,000,000 yen. While welcoming the formation of the concern as an instance of Japanese enterprise in Manchuria, the journal *Shina* (China), the organ of the To-A Dobun Kai (Asian Co-Literal Association) devotes some fifteen pages to the discussion of the outlook of this important but slightly developed industry in Manchuria.

Prior to the formation of the Russian company there was a movement to start a sugar concern with Chinese and Japanese capital, but the plan failed owing to the opposition of people in Mukden. The Russian enterprise encountered no such opposition, since it is located in North Manchuria. The output from its factory gradually increased until it reached 3,270,000 kin (kin $1\frac{1}{3}$ pounds) in the fourth year of its establishment, in 1911. Quite recently the production has shown a sudden increase, the daily output being stated at 104,000 kin. The Hulan Sugar Administration, although established several years ago, was not in actual operation until the winter of 1915. It is said that the daily consumption of material at the Administration factory amounts to 300 tons.

The percentages of sugar contained in the Manchurian beet, as shown by experiments in 1914 and 1916 on a dozen varieties at the Kunchuling and Hsiung-yocheng stations, ranges from 8.08 to 17.01 per cent., averaging more than 14 per cent. The richness in sugar of beet-roots raised on the Chinese experimental farms at Mukden varied from 9.92 to 17.67 per cent. Much the same result was obtained by examination of the produce from different localities carried out at the Central Experimental Station of the South Manchuria Railway. It is to be noted, however, that these percentages represent the maximum limit obtainable in various parts of Manchuria, for the same record can not be expected from the casual and undirected cultivation of beet by Chinese farmers.

As to the site for the factory of the South Manchuria Sugar Company, the journal doubts the wisdom of deciding upon Fushun, though this may be the right place for other industries. It prefers from various considerations localities north of Teihling on the South Manchuria Railway, and even advocates a reduction of freights by the railway in the interest of this Japanese enterprise.

The import of sugar into Manchuria in 1913-1915 averaged 455,629 piculs (1 picul is equal to 133 $\frac{1}{3}$ lbs. avoirdupois) a year, which is just 110,000 piculs more than the yearly output planned by the Japanese company. It is not improbable that sugar from the South Manchuria sugar factory may take the place of the import commodity at no distant date. The total population of Manchuria is 19,000,000, according to the latest estimates, thus the imported sugar is 2.3 kin per capita, a trifle over 20 per cent of the per capita consumption in Japan, but the consuming power of the people in Manchuria is bound to grow with the general progress in that part of the Orient.

Silver Hoard of the United States

The Wall Street Journal and other financial organs have been arguing of late that with bullion in the neighborhood of \$1 an ounce, the United States silver hoard against the outstanding silver certificates has become a potential factor in the silver market.

London has been the silver market of the world. It was controlled there and New York and San Francisco took London prices less freight, insurance, etc., as basis. The last effort of London to hold control of this market was through the Indian ruling regarding gold and silver imports and a law against the sale of the Indian currency as bullion, or in other mutilated condition. The effect, however, seems to have been nil. The control has slipped out of the hands of the London bankers. New York, which still follows London quotations, is apparently not yet in control of the market as its quotations fail to get the silver to this center. Reports from the interior and from Canada tell of higher prices being offered and paid for bullion which is being shipped to the Far East on account of the higher China exchanges.

The part that the United States silver hoard may play will be due to a revival of the agitation, which has laid partially dormant since the silver upheaval of the early nineties, and which included a proposal to sell the largest part of the 568,270,319 silver dollars. This sale now would not only help the Allies against whom the price of the metal is being driven up, but would be a further step in relegating the whole issue of currency to the Federal reserve banks. About \$500,000,000 of the coined hoard is held at the Treasury for an equal amount of silver certificates outstanding. At what price for silver bullion could this sum or any lesser sum be released for the benefit of the Allies without an actual loss to this country?

The total expenditure by the United States for silver bullion, exclusive of silver coinage, has been \$464,210,263 since 1878, 570,272,610 silver dollars, and \$33,118,575 face value of subsidiary coin were minted therefrom. Allowing for seigniorage and for the nineteenth fineness on the subsidiary coin, the 570,272,610 silver dollars were coined from \$434,403,546 worth of silver bullion. This would bring the average cost of silver in the dollar to the U. S. Government slightly over 76 cents for each dollar coined. As the value of pure silver in a silver dollar at 98 cents an ounce is 75.8 cents and at \$1 an ounce 77.3 cents, the price of fine silver has reached a point where the Government could come to the help of its Allies without loss.

The demand for the silver dollar is limited. Of the total issue of 568,270,319 silver dollars outstanding on December 31 last, only about 60,000,000 were in circulation. The balance of about 500,000,000 were held in the Treasury as metal reserve for an equal amount of silver certificates, taking up 125,000 cubic feet of space which are needed for gold storage. Allowing for an expansion in demand of about 100%, 450,000,000 silver dollars could easily be released and a permanent gold backing of 76% or better could be given to the silver certificates or other suitable paper currency of like amount. The sale of this hoard at cost or what is equal its export in bullion form to silver countries, especially India and China, in place of gold exports, would give a gold backing to the outstanding silver certificates second only to gold certificates, and better than the present greenbacks and the Federal Reserve notes.

Later reports from Boston says that dollar silver has become a reality with sales for deliveries at Vancouver effected at \$1.02 an ounce. Not only has the highest price in twenty-five years been attained, but silver mining company officials express the belief

that as the metal has crossed the dollar mark it will not stop rising until it has reached \$1.29 an ounce, thereby placing it on a parity with gold.

The president of a leading silver producing company says: "I have been talking dollar silver for some time, and now that the metal has reached and passed that mark I am afraid to make further predictions. It has been and is still a condition governed entirely by supply and demand, with a minimum of speculation attending the advance. Never were the demands so great for silver as at present, and it so happens that production is lowest for a number of years. A dozen years ago the world's mines produced 220,000,000 ounces or more of silver; last year they supplied but 175,000,000 ounces or thereabouts, of which the United States contributed 75,000,000 ounces. To-day Mexico is closed down as a factor, whereas it was formerly looked upon as one of the chief sources of supply for this metal. Canada is affected by reason of the drain upon labor for the army, and our own yield is suffering very much at the present time through the strike at western copper mines, which in the course of a year contribute very largely to the silver output. Anaconda, the largest single producer in the country, is shut down and so is the Butte & Superior Co., which produces almost half as much as the larger mine.

Supply and demand are the governing factors. All over the world governments are buying silver and coining it as never before. In the United States there is a big demand for coinage purposes, and while there have been no recent reports of purchases by this Government, I am of the belief that the metal is being bought quietly and under the existing high level of prices. Silver to my mind is to be "real money" again and once more established as such will always remain so. People want hard money and with such a scarcity of gold as is known to exist throughout the world, it means, I believe, that silver is to be considered in reserves. The percentage of gold against reserves in Germany is exceedingly low—around 11% as I recall it—while the Bank of England reserve is also comparatively low. This can mean but one thing—a further rise in silver—and if this extends to \$1.29 an ounce it will place the metal on a parity with gold.

FEDERATED MALAY STATES TRADE FOR 1916

The report on the Trade and Customs Department of the Federated Malay States for the year 1916, signed by the Acting Commissioner, Mr. E. Burnside, has the following items of interest:

The aggregate value of trade for the year 1916 was \$292,021,066 compared with \$223,772,343 in 1915, an increase of \$68,248,723, and nearly double the aggregate value of the year 1914. The amount per head, of an estimated population of 1,208,177, was \$241.70. Exclusive of bullion and specie, the total was \$289,564,799 or £33,728,560 at 2s. 4d. to the dollar, an increase of 30.52 per cent. The increase cannot be attributed to higher values alone as the percentages of increase in quantities clearly show. Imports of merchandise, which decreased in 1915, rose from \$60,015,935 in that year to \$69,621,113 in 1916, or 16 per cent. Exports of merchandise showed a healthy increase from \$161,838,118 in 1915 to \$219,943,686, a larger increase than that registered in the previous year.

The aggregate value of exports was \$220,548,118 compared with \$162,429,254 in 1915, an

increase of \$58,118,864, or 35 per cent. Cultivated rubber contributed \$54,140,130, and tin and tin ore \$3,054,720. Although there continued to be a stringency in tonnage, and restrictions in imports and exports were greater, the volume of trade was the greatest recorded in the history of the Federated Malay States and showed an increase of 30.49 per cent against the increase of 30.46 per cent of the last year. The rice position remained somewhat the same, except that there was a slight falling off in both imports and exports during the year under review.

The handsome profits so easily obtained from the cultivation of rubber have no doubt greater attractions, but the stability of the market for rice should not be overlooked. Licenses were granted for the export of 4,335 tons of cultivated rubber (as compared with 2,033 tons in 1915) to countries other than the United Kingdom, British Possessions, Protectorates and Protected States, of which 4,305 tons were for the United States of America and the balance for Italy and Japan.

The total revenue from all sources was \$26,478,766 as compared with \$21,154,106 in 1915. The increase in Customs (nearly three millions of dollars) was mainly due to higher values, larger exports of cultivated rubber, an increase of 50 per cent in the import duty on intoxicating liquors, tobacco, cigars, and cigarettes, matches, motor vehicles, bicycles, tricycles, and tires. The total receipts under excise amounted to \$3,290,493. Intoxicating liquors produced, \$1,324,499; tobacco, cigars, and cigarettes, \$1,355,066; matches, \$38,872; motor vehicles, etc., \$6,111.

Cultivated rubber produced \$3,846,792 against \$2,401,914 in 1915. A sliding scale on London selling prices was introduced in 1914 for assessing the export duty, and continued in force throughout the year.

Tin and tin ore produced \$7,948,431 against \$7,261,894 in 1915. There were also minor increases in copra, \$4,604; hides and horns, \$5,002; weighing fees, \$1,428; tapioca, \$861; coffee, \$257; gambier, \$80; and sugar, \$19. The total receipts on exports amounted to \$11,921,056. The revenue derived from the sale of chandu amounted to \$10,925,755 compared with \$8,598,443 in 1915.

There was a continued falling off in the number and tonnage of vessels (other than native craft) that entered the ports. The figures for the last three years were:

	No.	Tonnage
1914	4,635	2,027,447
1915	4,339	1,716,620
1916	4,141	1,600,629

Native craft show an increase.

The revenue, almost the whole of which was derived from boat licenses, shows a small falling off from \$4,876.25 in 1915 to \$4,540.45 in 1916.

The statistics for the year under review were abnormal, and the conclusion which can be fairly drawn from them is that, notwithstanding it was the second year of the great conflict in which so many have proudly given their lives for the cause of humanity, it was a year of recovery and progress in the Federated Malay States. The excess of exports over imports was \$149,075,170, and while there were increases in imports to the amount of \$10,129,859, comprised chiefly of foodstuffs, the net increase of exports was \$58,118,864, rubber being the largest contributor.

TOKYO LIGHTING PROJECT

The lighting capacity of the Electricity Department in Tokyo will be increased, in fulfillment of the contract concluded between the city and the lighting companies as an integral part of their scheme for enforcing a uniform tariff on electric lights in Tokyo and neighborhood. It is a five-year undertaking, beginning with 1917, at a total cost of ¥4,580,000. The fund will be raised by loans.

Japan's Cotton Industry

Increased Output since the War

During recent months the cotton spinners and weavers of Japan have been endeavoring to receive adequate consideration when the question of the revision of the Chinese tariff is undertaken, and this agitation draws attention to the history of the industry in Japan, and the extent it has attained in the Island Empire. The emergence of a cotton manufacturing industry in an Eastern country in which industrial ambitions take root, is attributed by a textile expert writing for the *Times* (London) to the fact that cotton is the clothing of the East. And going on to describe the conditions in Japan, he says:

The cotton fiber is the cheapest of the staples suitable for clothing, and it can be turned more cheaply than any other into serviceable goods; the product meets an instant need and the business in it is expandable beyond limit. With no cotton industry Japan would be no manufacturing country in the full sense.

Japan has attained by strides which look rapid in retrospect a considerable eminence in cotton manufacture despite her late start. Not until 1861 was there a cotton-spinning frame in the country, and after machinery had been installed by the farsighted chiefs of the Kagoshima clan a decade elapsed in which almost no headway was made. Even in 1883 the fifteen mills then extant had only about half as many spindles as Japanese capitalists would put into any new mill to-day. By 1900 there were over a million spindles, and there are at the present more than three millions, with many others upon order and arriving. The particulars are in some sort the measure of the national industrial advance, and are to be construed in the light of all the surrounding facts. The figures are one sign of Japanese industrial headway, even as the diversity of the new manufactures are another.

Home Grown Cotton and Imports

It could almost be said that it is because of Japan's first and successful efforts in manufacturing the great primary article, cotton goods, she has been enabled and emboldened to launch into the new and remote branches of industry which have so impressed recent visitors. Japan is not in any considerable degree a cotton-growing country, although in the south some 7,000 to 11,000 bales of a short cotton akin to native Chinese fiber are grown. The material is spinnable, but fit only for inferior purposes; and it is in Korea, rather than at home, that efforts are being made to produce a superior raw cotton in marketable quantities. A cotton-growing association, modeled after the British Cotton Growing Association, is promoting the cultivation of American seed, hybridizing plants, fertilizing the soil, and inculcating the alternation of crops.

Experience in the Old World has shown that a country may be a great manufacturing one without producing a pound of raw cotton; and, except to a negligible extent, Japanese mills have drawn their supplies from abroad. Ignoring seasonal variations, it can be shown that about 60 per cent of the supply has been drawn from India, and 8 per cent from China, with only 25 per cent from the United States, and less than 2 per cent from Egypt. In other words, the large preponderance comes from countries in which only coarse cottons are grown, and out of these materials only a comparatively coarse class of goods can be manufactured.

Japanese spinning mills are turning towards finer work, and with the aid of combing machines are producing yarns up to 60's counts upon ring frames successfully, but

predominantly their business lies in thick numbers. The statistics of cotton consumption suggest that the average is growing finer, for where, in 1913, Japanese mills consumed per thousand spindles some 690 bales per annum they absorbed only 511 bales last year. Indian spinning rises to no great heights of fineness, but, according to the last available figures, Indian spindles consumed 358 bales, where the Japanese used 690, and British spindles less than 77.

Increase of Spindles

Spindles have been added to the Japanese equipment, partly to make good the loss of production consequent upon the abolition of night work, but certainly for other reasons also. The market for Japanese yarns is good and is assisted by the high price of raw cotton in America, the high freights upon transit of the raw material to Europe, and upon its re-export in manufactured form to the Far East. It is old experience that Lancashire disabilities are Japanese opportunities, and the new orders for plant, amounting to over £2,000,000, show an appreciation of this position.

It is foreign to the ways of Japanese capitalists to order machinery rashly, and their purchases are made upon an ordered plan. When considering a project for a mill of 100,000 spindles the directors will first of all order 40,000, have them in work and see the sale of the product established before extending again, and yet again. The progress is cautious, but it is persistent; and the successive steps are adequate in themselves. The mills still import

spinning machinery and the more intricate plant in general, but the simpler machines are locally made at prices which preclude competition. Cotton gins, for example, costing £26 out from England can be constructed in Japan for £2 15s.

Weaving

Cotton weaving upon any considerable scale is of still later development than spinning. In fifteen years ending in 1910 the number of cotton looms doubled, but this implied merely the addition of 5,000 machines. Between 1910 and 1916 the total trebled, becoming 30,000, which number is soon to be increased, but the enlargement leaves the industry still in the day of small things. There are 800,000 looms in Lancashire, and when there is talk of Japan ousting Lancashire piece goods, some notice must be paid to the difference of scale. Regard must be had, too, to the classes of raw cotton employed and the fineness of the yarns spun. Japanese woven cottons are essentially of the coarser qualities, and although they have proved quite good enough to force a place for themselves in the China market they compete with coarse goods rather than with fine. Conversely, these same goods are exposed to the competition of other coarse and cheap makes and, notably, of Chinese cloths. Some stir has been made this year by the shipment to Calcutta and Bombay of Japanese cloths made in imitation of regular Lancashire cloths, but the capacity for their production is not at present large, and it is hardly professed that the copies are complete substitutes for the originals.

Progress in Finer Goods

In the Indian cotton industry the trend is towards the manufacture of finer and more highly evolved goods—cloth instead of yarn, bleached cloth instead of gray, and towards dyed and relatively finished goods. Japanese progress is already taking the same direction,

Cotton Spinning and Weaving Returns

A recent issue of the Board of Trade Journal contains the following statistics relating to cotton spinning and weaving in Japan:

						July- December, 1915.	January- June, 1916.	July- December, 1916.
SPINNING								
Companies	...	...	...	...	number	39	37	37
Daily average of working spindles	...	...	...	...	do	3,572,494	2,738,674	2,775,923
Ring	...	...	...	...	do	2,541,060	2,698,290	2,728,616
Mule	...	...	...	...	do	31,434	40,384	47,307
Cotton consumed	...	...	...	...	pounds	416,280,880	449,949,383	437,756,341
Average count produced:								
Ring	...	...	...	...	...	21.9	21.1	2.17
Mule	...	...	...	...	...	32.6	30.2	29.0
Production of yarn	...	...	...	...	pounds	363,678,433	394,107,629	383,039,178
Ring	...	...	...	...	do	361,949,549	391,459,605	380,007,238
Mule	...	...	...	...	do	1,728,884	2,648,023	3,031,940
Daily average of yarn per spindle:								
Ring	...	...	...	...	ounces	14.4	15.0	13.8
Mule	...	...	...	...	do	4.9	9.6	14.4
Waste cotton	...	...	...	...	pounds	50,356,569	52,546,915	51,378,289
Waste yarn	...	...	...	...	do	2,333,070	2,787,002	2,570,735
Operatives:								
Male	...	...	...	...	number	23,059	23,494	24,195
Female	...	...	...	...	do	92,817	99,208	95,349
Average daily wage:								
Male	...	...	...	...	cents a	24.69	24.72	25.08
Female	...	...	...	...	do	16.20	16.53	16.75
WEAVING								
Companies	...	...	...	...	number	17	18	18
Looms	...	...	...	...	do	28,420	29,962	30,258
Production of cotton goods	...	...	...	...	yards	254,519,452	283,551,160	276,629,948
Operatives:								
Male	...	...	...	...	number	3,586	3,710	3,764
Female	...	...	...	...	do	23,039	23,756	22,733
Average daily wage:								
Male	...	...	...	...	cents a	26.19	26.49	26.64
Female	...	...	...	...	do	18.82	20.12	20.37

a Converted to American currency at the rate of 0.498 cent to the sen.

but the successes hitherto have been most conspicuous in the classes of cloth easiest to make. A similar evolution is followed in all countries, and the older established manufacturers, and in particular those who command a high order of skill, have the consolation of knowing that their lead is not easily caught up by late comers. The efforts of clever competitors lower down the ladder are never to be ignored, and it is evident that the Japanese are restless under their backwardness.

Mr. Yamaji Muto, managing director of the largest spinning concern in Japan, in an article to the native press, declared lately that the time when Japan could really compete with foreign countries in the foreign trade is still remote, and that the industry is still in an embryonic condition. Industries must walk before they can run, and, taking an impartial view, Japan has no need to be despondent over her progress.

Decreasing Imports

Cotton manufacturing developments within Japan have made an unmistakable difference to the importation of cotton piece goods. In 1906 the import of cotton goods exceeded £2,500,000, and by 1913, by process of gradual reduction, the total had been brought down to £1,000,000, while further great reductions have occurred since the war. British goods formed so large a part of the whole that the British export records are quotable. Shipment of gray goods had been cut down more than one half between 1906 and 1913, and shipment of prints by more than four fifths. Exports of dyed goods showed some improvement, and those of bleached cloth no material diminution. All have been heavily affected by the war, and the erstwhile £1,500,000 and £1,000,000 have fallen to less than £500,000. Changes since the war are susceptible of alternative explanation and of possible reversal later, but evidently great changes in Japanese conditions would be needed to restore the former trade.

Japanese returns show with more definition the classes of fabric in which import business has remained possible, the chief being that of satins, Italians, and umbrella cloths, which are highly finished goods requiring the use of relatively fine yarns. Cotton velvets form an important line, and they are amongst the difficult goods to manufacture in perfection. The Victoria lawns are bleached fine fabrics, and, in general, the goods to which the Japanese market is still open are of a fineness beyond native reach for the time being. The goods made in Japan for export are, on the contrary, coarse, and are principally jeans, drills, T-cloths, shirtings, sheetings, and cotton flannels of the lower grades. The knitted cottons now made largely in Japan are of an undeniable cheapness, but of no great style or durability. Their cheapness has carried them in increasing quantities to India and Australia, and cheapness combined with the stoppage of German trade brought large quantities of Japanese underwear into the British market until their entry was restrained by the prohibition upon cotton hosiery. The success all round is one of cheapness more than of excellence, attained by the use of indifferent raw materials and of cheap but not very high-grade labor.

JAPAN'S PETROLEUM STRIKE

Petroleum has been struck in one of the wells in Minami, Kambara-gun, Niigata prefecture, belonging to the Japan Oil Company. The force was so great that the oil reached a height of about 20 feet over and above the pumping tower, which is more than 100 feet high. The neighboring fields have been converted into a sea of oil. This is the third gush within the last week or so. The quantity of the gush is estimated at 12,000 gallons and the total quantity of the flow in the first sixteen hours is put at 200,000 gallons.

Motor Industry after the War

[By H. C. B. UNDERDOWN, MANAGING DIRECTOR, COMMERCIAL CARS, LTD.]

Few industries have been more deeply affected by the war than the motor manufacturing industry. It is common knowledge that the petrol engine has played a colossal part in all military operations, of which transport can be said to be the keynote.

Every motor manufacturing shop in the kingdom has been working day and night practically since the outbreak of war, and to the uninitiated it would seem that, so far as this industry is concerned, the war has been something in the nature of a boon and a blessing.

What are the facts as regards the present, and what is the outlook of the industry for the future? In the first place, it must be remembered that it is divided into two parts, one producing pleasure cars, the other commercial motor vehicles. In August, 1914, the commercial vehicle side of the industry was, comparatively speaking, less important than the pleasure car industry. The war has altered that, and the commercial vehicle, motor manufacture which had already "made good" before the war, has far outstripped the pleasure car as a factor in the activities of our national life. It has become of vital importance in practically every department of industrial life. When war broke out, the great railway companies of this country were beginning to recognize this fact, and, just as at the front the motor lorry has acted as a link between the railway terminus and the fighting line, so in the future it will help to solve the transport problems of this and other countries.

With very few exceptions, those firms engaged in the production of pleasure cars are now engaged upon other work, work entirely unconnected with their usual business, to the complete disorganization of their careers, while the light car section of the trade is now confronted with the prospect of an invasion of American manufacturing interest under the direct encouragement of the Government. On the other hand, commercial vehicle manufacturers continue to turn out their own manufactures. Consequently, while the general effects of the war have been the same in both cases, in certain respects they differ considerably. Both have been suspended from doing ordinary business with customers except in very few instances; both have suffered great loss of good will, particularly in the colonies and foreign countries; both have invested their profits in buildings, plant, and machinery, the value of which after the war is problematical; and both are, of course, subject to the excess profits tax and munitions levy.

Danger of Position

But while the trade activities of the pleasure car manufacturer have been suspended, the commercial vehicle manufacturer is confronted with a danger arising from the very fact that he has continued to produce lorries on an ever-increasing scale. These lorries are practically all of one type and load-carrying capacity. They have been poured into the theaters of war accompanied by thousands of American-built lorries of similar type, and a very large number of them will come back into the country again when peace comes. It has often been said that the wear and tear and destruction caused by the war have been so great that this point can be ignored, but it can be stated as a positive fact that the maintenance of these lorries has been, and is being, so admirably carried out that the numbers which will have to be disposed of after the war will certainly aggregate very many thousands, and, even allowing for the large demand for commercial vehicles which will be called for by the period of reconstruction, it is obvious that

the disposal of their new productions alongside of these returned lorries after the war must be a matter of the gravest concern to commercial vehicle manufacturers.

It must not be forgotten that this side of the industry was still in its youth when the war began. Consequently the pre-war standard of profit used as a basis for the computation of excess profits and munitions levy is very low, and the increased profits, resulting from standardized manufacture of one type during the war, will be returned in taxes to the Government to a much larger extent than those of older industries. Furthermore, profits have been invested in new extensions and machinery, while taxes must be paid in cash.

Foreign Competition

After the war the British motor manufacturer will be confronted with the most intense competition, particularly from America. Already before the war the American pleasure car was making great headway in this country. During the war the Americans have extended their plants at home, and their markets all over the world, and particularly in British Colonies, practically unopposed by the British industry. The American must dispose of the ever growing production of his factories, and we know from past experience that he will not hesitate to resort to the severest price-cutting to enable him to do so. His financial resources, unaffected by excess profits tax, will make him a most formidable opponent for the British motor industry with its depleted cash resources and its capital tied up in buildings and plant.

The Association of British and Allied Manufacturers, representing practically the whole of the British motor car manufacturing industry, recently issued a statement of policy embracing proposals for a heavy import duty on foreign motor vehicles, with a preferential tariff in the case of the Oversea Dominions, the improvement of the Consular service, the alteration of banking methods, and emphasized the necessity of arrangements designed to prevent war service vehicles being thrown unrestrictedly on the market. It also associated itself with the recommendations put forward by the Federation of British Industries for the development of the Government service for the promotion of British trade in foreign countries under the Foreign Office.

Lessons of the War

It remains to be seen whether a real protective tariff for a certain number of years after the war will be adopted or not. This is not the place for a discussion on the respective claims of Free Trade and Protection as the future policy of this country. It need only be said that the adoption of a temporary high tariff during the period of reconstruction as an emergency measure would not necessarily imply a departure from Free Trade principles. But assuming that a tariff is created to help the motor industry, it is, in the writer's opinion, essential that the industry itself should take to heart the lessons of the past, lessons which the war has clearly shown can no longer be ignored.

The United States has shown us the value of a large output of standardized manufactures. It has shown us the value of combination with its reduction of cost of production and distribution. Labor has learned, or should have learned, that high output produces high wages, and will help to insure continuous employment.

If the motor industry is to profit by the lessons of the war and emerge successfully from the intense competition which will ensue

on the coming of peace it must set to work to introduce methods altogether fresh to the minds of many engaged in it. Too much reliance must not be placed on Government assistance, vital though this will be. The war has shown us that *laissez-faire* must give way to hustle. Competition between firms in the same line of business must give way to co-operation, specialization, and organization of the highest order.

Employers must take practical steps to encourage labor to see the folly for all concerned of restricted output by themselves taking a far broader view of the rights of labor. Distrust must give way to friendly co-operation. It should not be a difficult matter to evolve a scheme of collective action, financial and otherwise, which would enable the industry to fight its foreign competitors.

It is to be hoped that the British motor industry, which has proved itself to be as vital for the purposes of war as of peace, will not be behindhand amongst the industries of this country in showing that it has profited by the lessons of the past two years.

COIR MATS AS A PHILIPPINE INDUSTRY

Investigations by the division industrial supervisor for the province of Pangasinan have been made a basis for the assertion that enough coconut husks are annually wasted in the Philippines to make coir mats with a wholesale value of \$22,500,000. These husks are usually thrown into rivers and allowed to float out to sea, or they are burned or allowed to rot on the ground. During the year 1916, there were 735,000,000 coconuts gathered in the whole archipelago. The cleaned fiber from the husk of each of these nuts would have weighed approximately 0.22 pound. The fiber or coir from 20 of these nuts would have made a good doormat such as retails in the United States for \$1.50 and in the Philippines for \$2. It is estimated from experience in cleaning this fiber that approximately 80,850 tons of coir might have been realized from the husks of the coconuts grown in the islands during 1916.

The coir is obtained from the fresh husk of the coconut by pounding it on a log or stone with a mallet or stone, implements which are always at hand. Before the schools under the direction of the industrial supervisor took up the manufacture of coir, it was believed that expensive retting vats were needed, and that it would take approximately six months for retting process. The experiments in the schools have shown that this long and expensive process is entirely unnecessary. It is the purpose of the Bureau of Education to introduce the making of coir mats among the people as embroidery making and hat making are now carried on in the household. In this way the grower of coconuts may utilize both his material and his time.

There are now 14 provinces in which 1,000,000 to 9,000,000 coconut trees are bearing. In each of these provinces, it is estimated, enough unemployed labor is available, if properly organized, to build up a large volume of business in the manufacture of coir mats. The conditions seem to be favorable for employing both home and factory workers in the making of the mats. The coir rope from which the mats are made can be spun rapidly by children from 8 to 10 years, using a simple contrivance made from a coal oil box, a wooden roller, and a short piece of coir rope. If there were a central factory in which this coir rope could be used, and a permanent market for it established, the rope could be produced in the coconut centers, and shipped to the factory, thereby avoiding the necessity of shipping the whole husk.

Most of the coir mats now used in the United States are obtained from Java and Singapore by way of Europe.

PHILIPPINE FOREIGN COMMERCE

Philippine commercial statistics compiled by the Bureau of Insular Affairs of the War Department for the year ending June 30, 1917, show an increase in total imports of six million dollars, and in exports of ten million dollars, over those of the previous year. These larger figures, however, are subject to qualification, and on analysis are found to express advancing war prices rather than any general development in trade due to larger consumption and greater production.

Imports amounted to \$51,983,278 and in spite of higher prices continued below the figures of years immediately prior to the war, while the apparent improvement over the trade of 1916 is strikingly illustrated in cotton textiles and rice, in which the leading increases in value for the year were recorded, though the quantities imported were below those of 1916. Iron and steel continued at the low level that has prevailed throughout the war. The considerable decline in the quantity of cement imported is discounted by local production, which is beginning to assume importance. The world wheat shortage resulted in much reduced imports of flour, in which the Australian product became more prominent than since the war, while American flour lost its former conspicuous lead.

The export total of \$71,715,375 was by far the largest ever recorded, with the large increase over 1916, as in the case of imports, chiefly due to war prices. Quantities of hemp, sugar, and copra, the three leading exports, were below those of the previous year, sugar being materially below the high record of that year; but prices in each instance were higher, and reached such a phenomenal figure in the case of hemp as to result in an increase of nearly twenty-five per cent over the value of 1916. Against the reduced quantity of copra must be set a practical doubling in exports of coconut oil. Much enlarged local manufacturing capacity combined with the transportation situation greatly to increase the output of oil. The United States continued to be the market for oil, and for the first time took the lead in the copra trade, heretofore controlled by France.

The American demand for the Philippine cigar and a doubling of shipments to the United States was the ruling feature in a fifty per cent increase in the value of the cigar trade, shipments to other countries as a whole falling to even a lower level than had hitherto prevailed during the war. Though the quantity of leaf tobacco was about the same, materially better prices were realized, and the United States for the first time assumed some importance in this trade, taking a relatively high-grade leaf. Philippine embroideries continued to increasingly profit by the disturbed conditions in Europe, with a hundred and fifty per cent increase over the previous year, and supplied the American market to the value of a million and a half dollars.

With the practical completion of three years of war, a comparison of the country distribution of Philippine trade in 1917 with ante-bellum conditions of 1914 is of interest. In the import trade the proportion of the United States increased from 51% to 53% of the total. The Japanese increase was from 7% to 11%, while a smaller gain was recorded by China. The British proportion declined from 9% to 5%, the Australian from 5 to 2, and the French from 3 to 1, while 6% credited to Germany in 1914 virtually disappeared in 1917. In exports, the salient feature was the increase in shipments to the United States from 43% to 60% of the total. The proportion of the United Kingdom declined from 17% to 11%, due chiefly to the much reduced hemp trade of 1917, while the diversion of copra to the United States entered largely into the French decline from 8% to 3%. Shipments to Germany amounting to 4% of the total, in 1914 disappeared, while a new trade of some importance with Canada in hemp appeared in 1917.

RUBBER IN FRENCH INDO-CHINA

The year 1916 witnessed a great increase in the production of plantation rubber in Cochin China. Many small plantations began to produce for the first time, and the larger ones increased the number of trees tapped. It is doubtful if the area actually under cultivation increased greatly, because some new plantations have been abandoned and others have been neglected as a consequence of war conditions. The exports of plantation rubber from Cochin China during 1916 amounted to 549 tons, with a customs valuation of \$630,000 United States currency. This is an increase of 60 per cent in quantity and 100 per cent in value over the figures for 1915. A similar increase is expected during 1917.

Wild rubber was an important article of export from French Indo-China for several years. Haiphong, the chief port of Tonkin, was the principal point of shipment, although this product was shipped from every important port of these possessions.

This wild rubber is obtained by the natives from several species of lianas, or great tropical vines, which grow in the mountains of Tonkin and upper Laos and along the Anamitic chain between Anam and central Laos. Several methods of extracting the rubber from these lianas are practiced by the natives of Indo-China. One of the most common is to shave the bark to the wood after the manner of the "blazing" practiced by trail makers in American forests. As the latex emerges from the wounded cambium layer, the native gathers it on his finger and wipes it into a small receptacle made of a hollow bamboo stalk. The latex is partly dried and coagulated in this receptacle and is then smoked and rolled into a ball. To attain greater perfection in drying and smoking, several purchasers limit the size of the bamboo receptacle to a certain maximum diameter.

A single native is never able to collect more than 1 kilo of dry rubber per day and generally a native must work 4 or 5 days for a kilo of rubber. Even at this rate the profits are sometimes large, for native labor in the interior of Laos can be obtained for one half to 1 franc per day, and wild rubber in Saigon or Haiphong is sometimes quoted at 10 or 12 francs per kilo.

Exports of wild rubber from French Indo-China for various years since 1898 by ports have been:

Years	Hai-phong	Saigon	Ports of Anam	Total
1898	\$ 2,509	...	...	\$ 2,509
1899	59,299	\$ 722	...	60,021
1900	323,391	37,688	...	361,079
1902	71,564	18,525	...	90,089
1904	205,931	16,188	...	222,049
1906	566,513	84,609	\$10,300	661,420
1908	24,222	13,057	2,200	39,479
1912	100,360	60,841	14,500	175,701
1915	193	5,018	500	5,711

The dry rubber is brought down the Black and Red Rivers of Tonkin to Haiphong, across the Savannaket-Quang-tri and other trails to Tourane, or down the Mekong to Saigon. From these points it is exported to France.

Until the last two or three years the production of wild rubber in Indo-China has followed quite closely the rise and fall in the price of the product. The stoppage of this industry during the good prices of 1915-1917 may be attributed to several causes. The German firms, which operated extensively in the interior, have ceased operations in Indo-China since the beginning of the war, and the mobilization of European employees of other exporting firms has led these firms to restrict their operations and close many of their agencies in the interior. The attention now paid to plantation rubber in Cochin China may have had some influence on the market for wild rubber; but there is no doubt that much damage was done by bad tapping during the years of high prices.

Trade Development of China's Central Ports

[The following notes are taken from the Chinese Maritime Customs reports for the treaty ports of Shanghai, Soochow, Hangchow, Ningpo, and Wenchow]

At first glance the Shanghai statistics for the year 1916 would appear to indicate a considerable expansion of trade under all headings, produce shipped abroad particularly showing a gain of over 20 million taels in value as compared with the figures for 1915 and far surpassing those of any previous year. This advance in the total value of the port's exports represents, of course, a solid and satisfactory gain, although it will be found to be due to the greatly enhanced values of commodities rather than to any increase in the volume of the trade done in them. Similarly, the increased value of imports from foreign and Chinese ports, which shows an advance on last year's figures of some 9 millions, must be ascribed mainly to the higher cost of imported goods but is none the less a sure indication of the steadily growing prosperity of the port, maintained in the face of severe difficulties, including extraordinary tightness of money, irregular exchange, and lack of tonnage and its corollary, exorbitant freights. Once more we find the value of produce shipped abroad well in excess of that of imported goods, in spite of the abnormally high exchange rates for silver that prevailed during the greater part of the year.

General Improvements

The work on the Nantao Bund is now rapidly nearing completion. From a point opposite Tungkadu to the Native Customs bridge the bunding has been constructed of large paving stones resting on a concrete foundation, but from the bridge down to the first steamer wharf it has been banked up with timber and filled in with a mixture of rubble and ashes.

The steady increase in Japanese commercial enterprise is evinced by the opening during 1916 of another Japanese bank, the Sumitomo Yoko. The Nagai Cotton Manufacturing Company has established a new mill in the Gordon Road, while the Toyo Spinning Company has also acquired a suitable site for a cotton mill.

Japanese and Russian Prints

The gross value of imports for 1916 was Hk. Tls. 213,000,000 representing little increase in the total volume of trade, some items having even declined as much as 50 per cent, an estimate of the import trade of Shanghai based on values being entirely misleading. In the category piece goods the principal articles which show increase are Japanese gray shirtings, sheetings, jeans, and printed cottons, while a marked decline may be noted in the importation of gray shirtings and sheetings of European origin and in drills and T-cloths, both English and Japanese. A decrease of 25 per cent is also shown in Japanese cotton yarn. Japanese jeans continue to hold the market well, and their popularity is demonstrated by the fact that there is an increase of more than 50 per cent over 1915. The relaxation of the Russian regulations has resulted in a large increase in the importation of Russian prints, which totals over 120,000 pieces, valued at Hk. Tls. 480,000, being imported largely. The total value of cotton goods imported declined by over Hk. Tls. 11,000,000, or 10 per cent. Woollen goods, on the other hand, show an increase of 95 per cent.

Dyestuffs Situation

The local market for dyestuffs is now practically dead. Soon after the beginning of the war prices for aniline dyes increased twofold or threefold and remained at about 300 per cent above pre-war figures until

September, 1915. Re-exports to America and Japan then brought about a further rise in local prices, and it is known that an increase of from six to ten times normal figures was in some cases reached. The breaking point was attained in February, 1916, when, owing to numerous speculative transaction, prices suddenly soared up to as much as 30 times the 1914 level. This naturally put an end to the demand, and prices ruling now are strictly nominal.

Machinery Imports Lessened

There is a manifest desire to increase the number of local cotton, flour, and, to a less extent, paper mills among Chinese capitalists, but very little has been actually accomplished, for the all round increase in freight has rendered the importation of machinery of all kinds almost prohibitive. The metal market for 1916 was very much restricted, owing to the difficulty in obtaining supplies from the United Kingdom and America, while the prohibition of the export of metal from Australia still further curtailed local operations. A certain increase in the figures for iron angles, iron bars, iron nails, and iron sheets, as well as of tinned plates, mainly imported from America and Japan, should be noticed.

The market for coal during the year has been a very strong one at steadily increasing prices. In Japan the demand for coal for home industries has been so great that considerable difficulty has been experienced in obtaining sufficient supplies for regular consumers, while in China the price of coal all over the coast has risen to unprecedented figures, and there is no doubt but that many local factories will find that their profits in the near future will be seriously interfered with. The bad cotton harvest of 1915 is doubtless responsible for the increase of 15 per cent shown in importations of raw cotton, brought in mainly from India and America.

Chinese Cotton Deteriorating

The total value of Chinese goods exported abroad and coastwise during 1916 amounted to Hk. Tls. 323,700,000, an improvement of 6 per cent on the returns of the preceding year. From the point of view of Shanghai cotton mill owners, representing perhaps the most important of local industries, the year was the most unsatisfactory one for over a decade. A factor that worked to the detriment of this industry was the abnormal and constant appreciation of silver, which enabled Indian and Japanese competitors to keep prices at a comparatively low level in spite of the unusual advance in America and Indian cottons. A further unsatisfactory feature was the dearness of Chinese cotton, which was due to the poor outturn generally of the 1915 crop.

Certain dealers state that the quality and staple of local cotton is showing signs of deterioration, though the 1916 crop was a good one, and attribute this to the gradual degeneration of the seed which was originally introduced from America. The Cotton Testing House conducted during the year some interesting experiments on the two experimental cotton farms started in 1915 and now regularly supported by its funds; samples of all the best grades of American, Egyptian, and Sea Island seed were obtained and planted together with seed of native stock, and the results showed that, doubtless owing to climatic reasons, the latter thrived infinitely better than the imported varieties. But until the Chinese cultivator can be induced to adopt modern and more scientific methods there is little hope that the cotton industry in China will take the place

that it deserves. The principal faults that appear to characterize the methods of Chinese at present are: (1) ineffectual weeding, (2) injudicious interplanting of other crops, (3) lack of proper fertilization, and (4) defective drainage.

Of cotton yarn manufactured by the Shanghai cotton mills and intended for subsequent exportation, over 100,000 piculs more than in 1915 were reported to the Customs. Other items which show increases are drills, sheetings, white shirtings, and cotton blankets, the two last-named articles appearing in greater quantities than in any previous year.

Silk and Tea Markets

The condition of the silk market during the year has been disappointing. The steady demand for silk in the manufacture of war material and the increased consumption in America at first led market local dealers to believe that they would always find a market for their silk, notwithstanding its high price; but the great rise in exchange, as well as a very active native consumption, discouraged foreign buyers to a great extent, and a general and marked decline is shown in the export and re-export figures.

A similar downward tendency is to be recorded in the figures for tea, owing likewise to the high rates of exchange. It is of interest, however, to note that the manufacture, largely by machinery, of green teas is increasing in Shanghai to keep pace with the local demand. Of other items in the category of Chinese goods, bean and groundnut oils, and egg products show substantial increase over the figures for 1915. There should be a promising future for local enterprise in the last-named commodity; egg albumen and yolk are now exported in the frozen as well as in the preserved state.

Japanese Increases

The total tonnage entered and cleared under all flags amounted to 16,819,095, only a small fraction less than that reported during the previous year. British tonnage declined by about 100,000 and French increased by about the same amount, while Chinese decreased by over 200,000 tons. Neutral tonnage returns have kept a fairly even level, although American vessels entered and cleared show a slight falling off. Japanese tonnage is steadily on the increase, and if the present exceptional conditional conditions continue, Japan may at no distant date head the list of shipping. Owing to the submarine menace in the Mediterranean, most of the cargo boats, as well as the Nippon Yusen Kaisha passenger steamers, are now dispatched via the Cape. As for the American trade, when the Pacific Mail Steamship Co. resumed traffic between China, Japan, and the United States ports, less freight offered than was necessary to fill the tonnage on this run, in consequence of which rates on certain articles were considerably lowered. Shipping coastwise has been very much handicapped by the raising of freight rates between Saigon and Hongkong, the regular lines finding it hard to fulfill their engagements. For over two weeks shipping coastwise was held up before a compromise was arrived at. The close of the year saw a tightening up of rates all round, space being badly wanted for cargo destined for Mediterranean ports.

The Shanghai-Soochow-Hangchow steam-launch traffic has fallen off considerably, only 602,000 passengers having availed themselves of this mode of travel during the year. This is especially noteworthy when the statistics

of former years are considered, demonstrating the fact that the influence of railways is beginning to make itself more and more felt. This is fully borne out by the figure reported by the Shanghai-Nanking and Shanghai-Hangchow-Ningpo railways, the number of passengers carried by the former line having increased by about 300,000 and the latter by well over half a million. The linking up of the two railway systems was accomplished during December, 1916, and this will tend still further to ameliorate conditions in the matter of passenger and freight traffic. Side by side with the railways, the tramways can also point to increased returns, this method of locomotion becoming increasingly popular with the masses, and during the year under review all the tramways operating in and around the Settlements showed considerable profits.

Fishing Returns

Import values include a sum of Hk. Tls. 412,000, representing the 1916 catch of fresh fish, of which, it is estimated, about three fourths were brought direct from sea by fishing boats. Sea fishing is open to all, and there are practically no vested rights, but the Kiangsu and Chekiang Fishing Company, an officially recognized concern, looks after the interest of the fishing boats and provides two steam cruisers to patrol the fishing area for their protection. Piracy has been more prevalent than usual in the vicinity of the Chusan Islands, and many traders were seized during the autumn and held to ransom.

Shipbuilding Expansion

Vessels built at Shanghai for Chinese owners were 14 steam launches, 9 motor launches, and 3 steamers. On December 31, there were, on the Shanghai register, 31 sea-going Chinese steamers, 49 river steamers (41 Chinese and 8 foreign), 271 Chinese launches for inland waters navigation (247 steam and 24 motor), and 55 foreign launches for inland waters navigation (34 steam and 21 motor); total, 406. 64 launches were registered for inland waters navigation during the year.

Soochow Commercial Notes

The decrease in American kerosene oil imported into Soochow in the past year was nearly 40 per cent less than in the previous year. The high price of the oil drove the peasants in rural districts back again to the use of bean rapeseed oils. Not only has the use of electric light increased enormously in Soochow itself, but nearly all towns of importance in the neighborhood, such as Huchow, Wusih, Changshu, and Kunshan, now have electric light plants installed.

The cocoon crop was fair this year, and good business was done, in spite of comparatively high prices. At Wusih the market opened at \$45 per picul for the best grade, but it soon rose to \$55, where it remained. The price of cocoons at Soochow was pretty much the same as at Wusih, and the peasants realized good profits. When the cocoon season opened some greedy speculators who bought the cocoons from the peasants at very low prices attempted to sell the same at buying stations at forced prices. The matter was reported to the authorities, who had the parties arrested, thereby no doubt preventing serious trouble to the legitimate traders.

The total number of steam launches entered and cleared during the year was 1,697 and 1,692 respectively. This is a slight increase as compared with the figures for the previous year, though tonnage remains about the same. The increase in the number of steam launches entered and cleared under this heading was 3,400 and 3,407 respectively, against 3,092 and 3,115 in 1915, or an increase of nearly 10 per cent.

Ningpo's Cotton Crisis

The value of the export trade of Ningpo in 1916 was Hk. Tls. 11,153,784, showing an

increase of Hk. Tls. 544,233. The outstanding feature was the enormous advance in the shipment of raw cotton, which jumped from 91,715 to 149,741 piculs. As a result of the deficient crop of 1915, both growers and dealers were reluctant to part with their stocks in anticipation of better quotations. Their attitude was encouraged by the intended reopening of the two local mills, which had to suspend work till the autumn, throwing 4,000 mill hands out of employment, owing to the dearth of raw cotton. Speculation was rife and prices rose to \$39 per bale of 120 catties, but fell to \$33 per bale after an excellent crop, especially good in the Anchang, Yuyao, and Tzeki districts. Large amounts were exported in October and November.

Pingsuey tea diminished in quantity but increased in value. A decline in export of 11,905 piculs was being recorded. The tea trade was high up-country prices, obstruction of roads, heavy freights, adverse sterling exchange and foreign merchants did most of their purchasing in Japan, India, and Ceylon. Prices opened at Shanghai Tls. 31 per picul and gradually dropped to Shanghai 25, and the merchants lost the greater part of the profits they had accumulated in the previous year.

Ningpo's Import Trade

The gross value of foreign goods imported into Ningpo during the past year aggregated Hk. Tls. 10,838,958, as against Hk. Tls. 9,038,877 in 1915. This augmentation does not, however, denote an accompanying expansion in the quantity of goods imported, but arose from the higher cost of nearly all articles of foreign origin. Handkerchiefs came forward by 11,502 dozen, and, with the exception of this article, we find declines in most other items. The reduction in foreign piece goods was occasioned by the successful competition of similar Chinese manufactures, which have obtained a good hold on the market.

Slab tin is the only article worthy of comment under "Metals." The importation of this metal, extracted in the Straits and forwarded via Hongkong, exceeded that of the previous year by 8,406 piculs and was, for the most part, sent to Shooching, the center of the joss or sacrificial paper industry. Cigarettes improved by nearly 1½ million taels and, in spite of being more expensive, they were in great demand. The only transaction in indigo was the re-export of 792 piculs. The cost of this article was \$500 per picul but dwindled later to \$250 per picul. Japanese matches jumped from 100,170 gross of boxes in 1915 to 145,447 gross, and, owing to the favorable exchange, were sold at cheaper rates. This, coupled with the superior quality of the Japanese product, contributed in ousting the manufactures of the local factory.

Export Notes

The figures for white alum doubled those for 1915. As usual it was imported by junk from Pingyang, between Ningpo and Wenchow, and shipped mainly to Japan, where it is used in the manufacture of dyestuffs. Owing to bad weather and frequent robberies on fishing boats the catch of cuttlefish waned by 2,227 piculs. Groundnut oil also shows a decline, due no doubt to the smaller demand for expensive kerosene oil and the increased consumption of the cheaper native article. The samshu trade was again affected by the heavy taxation imposed by the Government Monopoly Bureau. The net value of Chinese imports was Hk. Tls. 7,909,365, an improvement of Hk. Tls. 582,136. Shanghai sheetings and cotton yarn jumped from 67,210 pieces and 3,314 piculs to 119,964 pieces and 8,377 piculs respectively.

Fushun and Kaiping coal rose from 18,209 tons, valued at Hk. Tls. 104,565 to 27,206 tons, valued at Hk. Tls. 184,412. The Kaiping product, helped by the short supply of Japan coal and the smaller output of the Fushun mines after an explosion, has obtained a firm hold on the market, in spite of being smoky and hard to burn.

The importation of groundnut oil soared from 260 to 1,438 piculs, due to the augmented cost of kerosene oil. The larger use of the native oil has sent up the retail price by one third. The figures for indigo surpassed those for 1915 by 4,812 piculs—the native indigo being used as a substitute for the unobtainable German article, and the once-flourishing indigo industry has been revived in the neighborhood of Ningpo. A good harvest was followed by a reduced importation of rice during the last two quarters.

Industrial Development

A mat-weaving company was started, with a subscribed capital of \$10,000, with the object of manufacturing rush mats of soft texture; but little success attended its efforts. Work on the railway was at a standstill, due to the non-arrival from Germany of the steel spans for the bridge over the Tsao-o river. In the hope of obtaining an easy supply of fresh water for the Campo community two artesian wells were constructed, one near the main road behind the settlement and the other near the railway station. The water was at first impure, but with constant use the supply is improving. The Chinese banks, numbering 33 in all, are reported to have had a profitable year.

Hangchow's Transportation Problem

The gross value of the trade that passed through the Hangchow Custom House and its sub-office at Kashing was higher than in any year since 1909, having amounted to Hk. Tls. 21,177,109, with an increase of more than Hk. Tls. 1,000,000 as compared with the figures for 1915. The increase comes under the two headings of foreign imports and exports of local origin. It is partly attributable to the fact that for two busy months of the year the Shanghai-Hangchow Railway, which is out of Customs bounds, was closed to through traffic and the whole trade of this district had to be carried by the canal route and was thus brought under the cognizance of the Customs.

It is to be expected, as the years go by, that the railway will tighten its hold in the import and export trade of Zakhkow, the railway terminus, and that water-borne cargoes to and from Hangchow's port and Settlement by way of the Grand Canal will be correspondingly reduced. Zakhkow is the local gathering-point and distributing center for most of the Ch'ient'ang River trade, outwards and inwards.

There is a section of railway between Zakhkow and the port of Hangchow, a distance of about 10 miles, but it is obviously not the policy of the railway administration to allow this to be used as a feeder for the steam launch lines that compete with them for the carrying trade to Shanghai. To supplement railroad communication a high road, suitable for wheeled traffic, is projected in the near future. For the present, however, the chief link on which the launch companies have to depend for maintaining connection with the river and its markets is a slow service of canal boats on narrow waterways of different levels, and interrupted by haul-overs, over which portage of cargo is necessary.

Commerce of Hangchow

The net value of foreign goods imported into Hangchow during the year is estimated at more than Hk. Tls. 4,300,000, an improvement over the corresponding figures for the previous year of some Hk. Tls. 1,300,000. Tin in slabs declined from 3,968 to 346 piculs. This unusual falling off is attributed partly to restricted supplies of the metal, partly to a slack demand for joss paper, and most of all to changes in local taxation whereby the Shao-hing joss paper industry can more cheaply import its raw material by way of Ningpo.

Chief among imports, in point of value, are cigarettes. These have advanced from 168,000 mille in 1911, and 426,000 mille, valued at

Hk. Tls. 937,000, in 1915, to 438,000 mille, valued at Hk. Tls. 1,775,000—an increase in value of nearly 90 per cent for the year. The British-American Tobacco Co. maintains a virtual monopoly of the cigarette trade of this port. A rival Chinese concern—the Nayang Brothers Company,—which has recently entered the field, is said to dispose of about 150 cases, or 3,750 mille, monthly, but their importations arrive by rail and do not appear in the Customs Import tables.

Japan matches increased by 98,000 gross—the high prices of imported match-making materials and their comparative scarcity having operated against the local industry. Weaving machinery, with a value of Hk. Tls. 51,000, is well in advance of the previous year's figures. It consists chiefly of Japanese hand-machines for the weaving of silk piece goods of various new designs which are much in demand.

There was a decrease of some 300 piculs in the export of raw silk, but silk cocoons, waste silk, and silk piece goods all show improvement. The silk piece goods weaving industry, which suffered a severe set-back at the time of the revolution, is gradually resuming its old importance. The local production of silk could be vastly augmented if none but healthy silkworms were reared. Unfortunately, the country people engaged in the industry are not alive to the importance of using scientifically tested seed and the best methods of sericulture. They still look to tradition rather than to science to help them out of difficulties, and when their silkworms succumb to disease, as so frequently happens, they attribute the misfortune to any cause but the right one. There has been an efficiently conducted school of sericulture in Hangchow for years, but its influence on the home industry has not made itself felt to the full extent desirable. It is now realized that if it is to become fully serviceable a much more active propaganda is required and teachers and lecturers must be sent out more freely into the countryside.

The export of samshu, which used to amount to a few hundred piculs a year, has grown remarkably in the last two years, being now more than 34,000 piculs. The new growth in the trade is not expected to be of long duration. It is not attributed to any great increase in consumption but chiefly to the movement of old stocks from Shaohing for storage in the Foreign Concession at Shanghai to escape an extra stamp tax of 43 cents for each big jar or 22 cents for each small jar. Under the new wine monopoly system of taxation any stocks left unsold in Shaohing at the end of a year would become liable for the next year's stamp tax.

Wenchow "Willow" Tea

As compared with the results in 1915, foreign imports gained Hk. Tls. 88,275 and Chinese imports lost Hk. Tls. 178,845. Exports gained Hk. Tls. 198,895; and the net value of the trade on the whole shows a gain of Hk. Tls. 108,325.

The most important export feature was the enormous falling off in black tea, only 2,188 piculs shipped, against 13,332 piculs in 1915. Bad crops in neighboring districts and slack market at Shanghai, where all our teas are exported, are the reasons generally given, but there is another reason probably nearer the truth; in 1915 fraudulent blending of willow and other leaves on the part of the growers was discovered by the exporters, who thus became particularly cautious and ceased buying in 1916. More confidence was reposed in the green teas of the Anhwei and other factories at this port, and also on the unfired leaf shipped to be prepared at Shanghai, and although increases were shown by the two latter articles, they are still a long way off compensating for the loss on black tea. The prohibition on all import of foreign tea into Great Britain, which has just been announced, will severely handicap this port's business, and until peace has been restored traders' attention is directed to the various products now in demand by belligerent countries.

Cotton piece goods show an increase of Hk. Tls. 58,000 as compared with the figures for 1915, caused by the larger importation of jeans, viz., 15,255 pieces, against 8,280 in 1915. Japanese cotton yarn, favored by the rise in exchange, increased by 2,717 piculs, while woollen goods, foreign metals, aniline dyes, and umbrellas declined, due no doubt to the war. Japan matches decreased from 37,900 to 20,000 gross, their place being taken by Chinese manufactures from Shanghai and Hangchow. Kerosene oil continued to decline through direct shipments by junks from Shanghai to places on the coast, local extension of the use of electric light, and particularly high prices due to higher freights. From 848,300 gallons in 1915 the importation receded to 522,300 gallons. Palm-leaf fans were 80,600 less than in 1915 the loss being attributed to importation of coarse paper and straw fans from Taichow, in this province.

Export increases were 37,406 piculs in alum, 3,396 piculs in lard, 3,268 piculs in vegetable tallow, and 1,665 piculs in cow hides. As regards this port's special product, Wenchow oranges, the exportation was unprecedentedly large, owing to good harvests. More could have been exported had it not been for lack of means of transport. There was a decrease of 4,930 piculs in leaf tobacco, somewhat counterbalanced by an increase of 685 piculs of prepared tobacco.

The export of paper umbrellas increased conspicuously. It is reported that a trial shipment to the Philippine Islands was very successful. The umbrellas were first sent to Formosa, and it is said that they were subsequently shipped to the new market. Vegetable tallow, which had disappeared from the returns for the past two years, has now reappeared with significant figures, owing to demand abroad. The exportation of wood poles decrease to 830,726 pieces, against 1,107,903 pieces in 1915, owing to a continued drought prevailing in the latter part of the year which hindered conveyance of timber from up-river regions.

Cotton yarn made by the Shanghai and Ningpo mills decreased by 4,977 piculs on a total importation of 10,932 piculs in 1915. The loss may be explained by the increase already noticed of 2,700 odd piculs of Japanese yarn, and 2,900 piculs of yarn from Chinese mills imported through the native Customs. There was a good crop of cereals and beans, and therefore the importation of beans decreased and no rice was imported.

JAPAN'S PROGRESS IN THE SUGAR INDUSTRY

Japan within its own limits and previous to its acquisition of the island of Formosa after its war with China, has always been making a limited quantity of sugar, this amounting during recent years to nearly 10,000 long tons, valued at about 6 millions of dollars. With the acquisition of the island of Formosa a new era in the history of the sugar industry opened up to Japan and the government sent several agents to Louisiana to investigate the American sugar industry with a view of applying in Formosa all desirable data here acquired. The Japanese seem to have been first attracted to Louisiana by the Cotton Centennial Exposition held in 1885. At that time one of the Japanese commissioners in charge of the leading exhibits was asked how it was that they, the Japanese, who had so recently entered the arena of the world's commerce, should be able to make such a splendid exhibit in New Orleans of their own handiwork in distant Japan. The answer was quick and ready and effective. The commissioner said: "Why, we began our industries with all you

knew." The conclusion was evident, and that is, that they did not have to struggle through years of experimentation, but taking all the advances made in the progress of the United States, and thoroughly comprehending them, then they added thereto their enterprise and untiring industry and believed themselves and found themselves capable of competing with the rest of the world in the open markets of the world. This they seem to be doing now.

In regard to the sugar industry, the government recognized the importance of this industry and was willing to grant ample protection and state aid to its development and it is expected that the immediate island production will be raised to some 75,000 tons. This domestic sugar, so to speak, is reported at present as being about 80 per cent dark brown in color and 20 per cent of lighter color and efforts are now making to have this sugar of the modern vacuum pan crystal type.

The first sugar refinery was established in Japan in 1896 and now there are eight sugar refineries on the island with a capacity of 1,300 tons of sugar per day. The exports from Japan now consist almost entirely of refined sugar and during recent years these exports have reached about 76,000 long tons, valued at 6 millions of dollars. The principal markets for these sugars have been in China, where Japanese sugar is gradually supplanting Hongkong sugar.

The chief center of development in the sugar industry for Japan has been in the great island of Formosa. Here the government afforded generous assistance, which took the form of employing experts, the establishment of an experiment station and subsidies granted and the loan of machinery. With these advantages the production of sugar in Formosa increased rapidly. Prior to 1902 the production had never reached 60,000 long tons. In 1906 it reached 75,000 long tons and in 1916 406,000 long tons, 90 per cent of which was vacuum pan centrifugal sugar.

The first sugar factory in Formosa was organized in 1901, and now there are fourteen corporations, owning thirty-seven crushing factories, with an aggregate capacity of 27,240 tons of cane per day of 24 hours. These corporations have paid up capital amounting to some twenty-eight millions of dollars. Although in the beginning of the development of this export of sugar from Japan to other countries that feature of the matter was considered as of secondary importance, the large development of the industry is now leading to efforts for the disposal of Japanese sugar in other markets. There is every reason to believe that the industry will assume considerably larger proportions.

VALUABLE INFORMATION ON PUMPING

The Goulds Manufacturing Company, located at Seneca Falls, New York, U.S.A., has recently published two pieces of literature on the subject of pumps, which will be of interest to all users or prospective users of pumps. "Do Your Pumping Electrically" is a little circular devised for the benefit of electrical and plumbing contractors. It treats of private water supply for farms, for irrigation, for drainage, for fire protection, for sprinkling lawns and for use in cities in such institutions as water-works, sewage plants, and factories. The economy and convenience made possible from the use of electrical pumps are emphasized in a most interesting manner.

"Goulds Pumps for Every Service" is a reference book on pumps for use on farms, ranches, plantations, and in dairies. It is valuable for the guidance of country residents, farmers, ranch men, plantation owners, and dairy men. It treats of the points to consider when selecting a pumping equipment and gives information concerning the various types of Goulds pumps of which there are over four hundred types.

New Gold Dredger in Paracale Philippine Islands

The gold dredge designed by the New York Engineering Company for the Mambulao Placer Co. of Paracale, in the island of Luzon, which went into operation in July, 1916, is working satisfactorily though it contains several novel features.

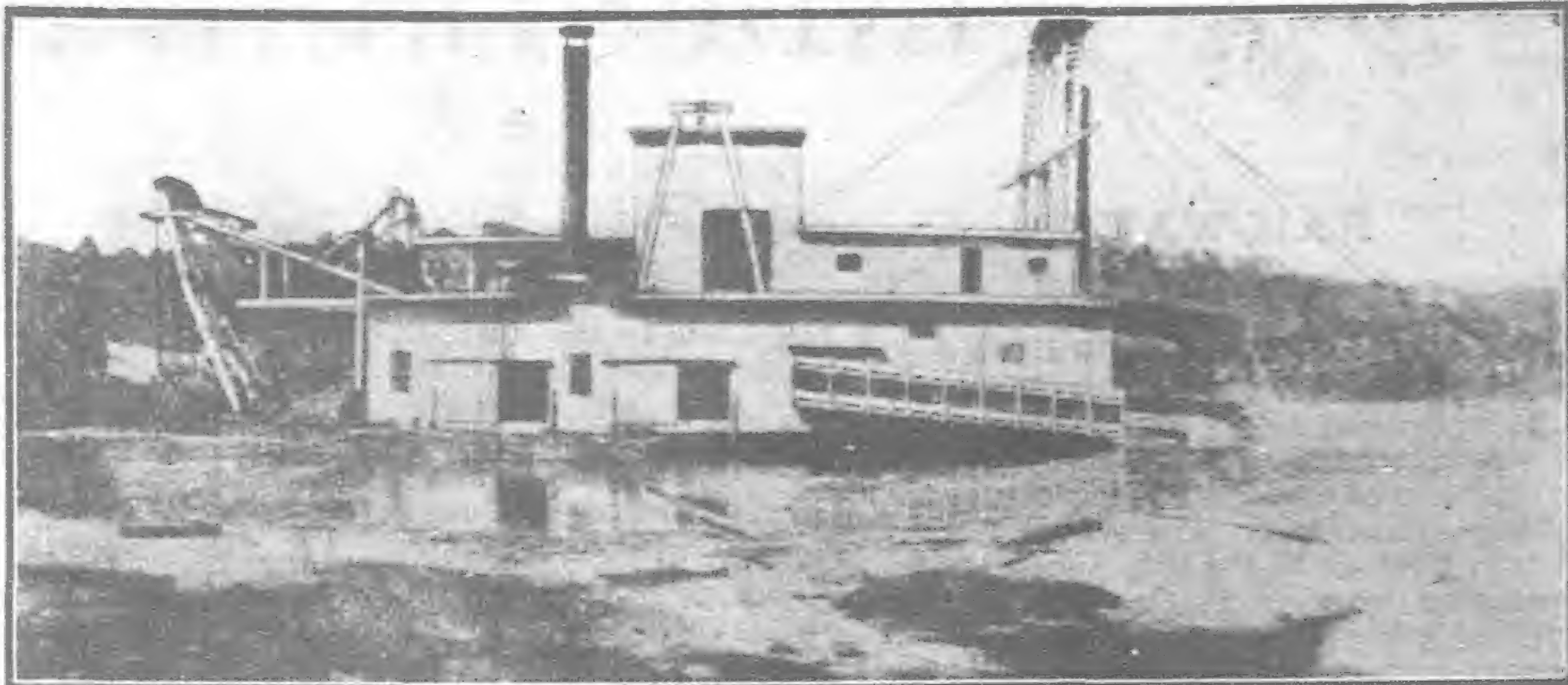
The placer ground, which it is treating, extends into the bay of Mambulao, and in this respect resembles the Tongkah Harbor Company's property. This bay is subject to severe storms and typhoons. During construction work, one of these typhoons occurred, carrying houses to a considerable distance, and doing much other damage. The erection of the dredge was not interfered with, as provision had been made against storms of this character.

This dredge is driven by a turbo-electric generating plant, placed on the dredge, and supplying electric power for the motors, which drive each separate unit. A clay sluice has been introduced. This is placed directly over the screen on the top of the dredge running aft to the stern, where it divides into two branches, each branch extending over and beyond the stern about 35 ft. This sluice is intended for the purpose of by-passing the large amount of barren overburden, which is about 45 ft. deep and consists of sand, clay, and soil. The auriferous gravel lies underneath this, and is from 5 to 10 ft. thick. When the buckets come to the gravel, a hinged gate at the top of the sluice is opened, and the gravel is thus dumped direct into the screen chute.

The steam electric plant consists of a 625 K.V.A. steam turbine, direct connected to an alternator working at 440 volts. A water tube boiler is arranged for burning wood fuel, and has straight tubes with header openings at each end to facilitate cleaning. The boiler furnishes steam at 156 pounds pressure, and the steam turbine runs condensing, having a vertical type of condenser with 1 in. brass tubes. The condenser is cooled by the water from the large centrifugal pump, as it passes on the way to the gravel-washing screen. The vertical type of condenser, with the large tubes, prevents the deposit of sediment and sand which this water carries, owing to the fact that the wash water must be taken from the dredging pond.

A separate electric motor is provided for driving each of the units of the dredge, the total of these motors aggregating 450 h.p. This arrangement of the steam plant has secured a great economy in fuel consumption, as the dredge requires only fourteen cords of wood per day at full load. It is estimated that if the dredge had been equipped with the usual type of individual steam engine for each separate unit, the fuel consumption would have been approximately double this amount. This estimate is based on the calculation of other steam-driven dredges operating in the Philippines.

The placing of a number of steam engines in different parts of the dredge, to drive the different units, has always been a most objectionable feature, as each engine requires individual attention. Such engines are not readily operated and reversed from the pilot house, whereas the alternating current motors practically require no attention, and are readily started or reversed from any place, as many of the large and important motors have electrical control apparatus placed at different points of the dredge, from which they may be instantly stopped in case of sudden accident. The steam electrical plant also does away with a large quantity of small steam piping, which is required when there are numerous small engines in different parts of the dredge. It is difficult to keep all of this small piping tight, and it is also difficult to maintain a suitable vacuum in the condenser where so many small pipes return from the engines to the condenser.



THE MAMBULAO GOLD PLACER DREDGE

The dredge digs 55 ft. below water line, and stacks 35 ft. above water line. The hull is 136 ft. long, 10 ft. deep, and has a beam of 47 ft., with an overhang of 3 ft. on each side. The hull is of wood, and as it operates in salt water, a ship sheathing-felt is placed outside the regular 4 in. planking, and this in turn is covered with 1½ in. native planking. This felt is a hair felt, which has been dipped in preserving material, and then rolled into flat sheets about ¼ in. thick. It is sufficient to prevent injury by boring mollusca. The wood hull was decided upon because it was cheaper, and the steel hull when working in salt water would require frequent docking and painting, which is impractical in this particular case. The ventilation of a wood hull in the tropics is the most important point, and this was very well taken care of in the present installation, by the fact that the steam turbo-generator required a large amount of air for cooling the armature. This air is taken directly from the hull and then passed through the armature; thus it causes a complete change of air throughout the entire hull every ten minutes.

Provision had to be made in this dredge for taking care of the rise and fall of the dredge on the digging spuds, due to the operations of the tide. This involved the paying out of the spud lines and taking care of the slack automatically. This was accomplished by having the sheaves blocks at the upper end of the spud mounted in a sliding frame so that they had a vertical movement within the spud of about 6 ft. This takes care of the slack in the spud line as the tide falls. Another feature of interest is an equalizing sheave, which is placed on the top of the main gantry for the ladder-hoist ropes. The ladder-hoist rigging consists of two sets of lines, one on each side of the ladder. One end of each line runs to the double drum of the ladder-hoist; the other two ends of the line join and operate over this equalizing sheave at the head of the main gantry. This takes care of any undue stretch in either set of ropes and equalizes the strain on both sides of the ladder. A similar arrangement was also applied to the hanging of the long stacker, which, instead of being supported at two points, is suspended from three points, the supporting rope being reaved through equalizing blocks at the three points.

The buckets each consist of a one-piece manganese steel casting, the lip and hood being cast integral with the back, thus doing away with all rivets in the bucket. The lip is so proportioned as to last as long as any other part of the bucket. This type of bucket was adopted on account of the easy digging of the ground in question, but it should not be assumed that this design is suitable for all conditions of ground. The bucket has come up to expectations, and the wear appears to be equal on all parts. This doing away with all

rivets in the bucket saves a large amount of time and repairs.

The dredge is equipped with a nine-drum winch, leaving two spare drums for extra requirements. The revolving screen is 40 ft. long and 6 ft. 6 in. in diameter, with tyres having a 12 in. face. It is supported on a cast steel trunnion ring at each end, and it is driven by one driving roller placed under the center of the lower ring, while two small side idler rollers, placed on each side of the ring, hold the screen in place. The manganese steel thrust rollers on each side take the longitudinal thrust of the screen.

A second dredge will probably be installed at a later date, and then the steam electric generating plant will be taken off the present dredge, and placed on shore. The removed plant, together with another power unit, will then furnish current for both dredges. The placing of the power plant on board the dredge when only one dredge is in operation offers many advantages, but when two or more dredges are at work, a central power station for them all, built on shore, is more efficient and convenient. The dredge cost \$300,000 but is operating in ground that should soon repay the capital cost.

WHO'S WHO OF AMERICAN RETURNED STUDENTS

The Tsinghua College, Peking, in publishing this work has set an example to other groups of returned students which might be followed with great advantage. The book contains over 200 pages; over 400 names of students, with a sketch of their careers, and is printed in both English and Chinese. Mr. Y. T. Tsur, the popular President of the College, contributed the preface, in which he gives a brief review of the movement for educating Chinese in western lands, and points out that after Japan, the United States has turned out the next largest number of returned students, with Great Britain as a third, leading the countries of Europe like France, Belgium, and Germany.

The editors (Messrs. G. T. Chao, F. T. Liang, and M. Wu) explain that the book is published with two objects in view, one to promote a better understanding among the returned students, and the other to serve as a work of reference to the public, who may now or in the future stand in need of the services of western-educated students.

While the names are not placed in alphabetical order in the book, facility of reference is secured by an index of names, though we think an alphabetical arrangement of the biographies themselves would be found more serviceable.

ENGINEERING, FINANCIAL, AND INDUSTRIAL NEWS

RAILWAYS

Ssupingkai-Chengchiatun Railway.—The wooden bridge over the Liao at Sankiangkou on the Ssupingkai-Chengchiatun Railway was completed on November 13 under the superintendence of Mr. Tanabe, the engineer in charge. The work was started last April, and was held to be the only difficult piece of engineering work in the construction of the railway. It has 167 piers and is built of wood excepting a span of steel truss (60 ft. in length) in the center of the bridge, with one of 30 ft. long each on either side. The construction work was seriously hampered by the floods in August three times.

At the opening of traffic over the new bridge a locomotive, bearing Engineer Sato, who was present on behalf of Chief Engineer Fujine, and a few directly concerned in the construction work, crossed the bridge and returned. Then the locomotive was attached to the passenger cars carrying the chief officials of the Railway and visitors invited to attend the function, numbering about 150, and crossed the bridge, which is about 2,200 ft. long. The whole line is expected to be thrown open to traffic during December. Public traffic, for both passenger and goods, was opened provisionally over the Ssupingkai-Pamiencheng section on November 1.

The Yokohama Specie Bank underwrote the Ssupingkai-Chengchiatun Railway Loan on the estimate that Y.5,000,000 would be enough for construction. The rise of prices caused an excess of the estimate by about Y.1,500,000.

The proposed railway lines for which Japan has secured the preferential financing claim include the extension of the Ssupingkai-Chengchiatun Line to Taonanfu and then to Jehol, and one from Kaiyuan to Hailungcheng. The rise of prices and silver renders the construction of these proposed lines at present inopportune.

Japanese to Extend Shantung Railway.—An engineer of the Shantung Railway with an assistant started from Tsingtao recently to conduct preliminary surveys for the extension of the railway from Tsinan to Taokowchen. He will also go to Tsechow, Shansi, by the Taokow-Chenghua line running across the Peking-Hankow Line. Then he will come back to Weihui, and will go south to Chengchow, thence to Kaifengfu by the Kaifeng-Hunan Line, and back to Tsinan. He expects to put in about 45 days on the tour.

American Railroad Men in Manchuria.—A dispatch of the Harbinsky Vestnik from Vladivostok says that a detachment of twenty American railroad men has arrived here for work on the Manchurian Usuri Railway, in the northeast corner of Manchuria. Many American engineers have been arriving in Siberia to serve on the Siberian railway. By way of experiment, some of them operated trains at Tomsk with a remarkable result.

Russian engineers thought that, at best, their American comrades would be able to run 24 trains only during the 24 hours. It was therefore with great surprise and admiration that they found the Americans actually running 70 a day without a hitch. Thanks to their skill the goods which had accumulated at Tomsk and neighbouring stations were disposed of in the course of one week.

Sinkiang Motor Truck Scheme.—The Chief of the Bureau of Industrial Development for Sinkiang, in a memorandum submitted to the authorities, points out that though Sinkiang has always been regarded as indigent, and special grants have been made by the Central Government to defray the deficit on the administration, it is in fact rich in resources and capable of being developed into a wealthy province. The main difficulty is lack of transportation, the land journey to Peking of 3,000 miles taking over a hundred days. Mr. Yen is of the opinion that the institution of a motor lorry service on a large part of the caravan route would be both practicable and profitable. He proposes an undertaking of this kind with a capital of \$1,000,000, and believes that if it were realized the development of many mines, now unprofitably worked on the old-fashioned native system, would become possible through the importation of modern machinery which cannot be transported by camels. Apparently, petroleum is found in great abundance in its free state, and is procurable without the trouble of boring wells. The inhabitants use it as an illuminant, but of course obtain poor results, as no serious attempts are made to refine the oil. Great quantities run to waste. Cattle breeding is another industry capable of great development. In the northern part of the province there are enormous stretches of vacant territory which in the summer is covered with thick verdure, affording the finest feeding for cattle.

Chosen Railway Plans.—Mr. Y. Kubo, Director of the South Manchuria Railway Co.'s Chosen Railway Office, Seoul, while visiting Dairen, stated that with the prospective opening to traffic of the Seishin-Kwainai Line on the 25th inst., the railway construction program in Chosen will leave the Yeiko-Kanko Line only to be completed in the course of a few years. An extension from Kanko to Yujo on the Seishin-Kwainai Line via Hokusei and Joshin is certain to be built sooner or later, bringing into existence what may be designated as the Trans North Chosen Line.

The construction of this extension will require a comparatively heavy outlay, something like Y.35,000,000, as much engineering difficulty will have to be surmounted in the work between Joshin and Ryoio. The construction program is to extend over ten years till 1927, and an appropriation for the first section between Kanko and Hokusei will be included in the estimates for the next fiscal year, subject to the indorsement of the Imperial Diet. In addition, it will be necessary to connect the Seoul-Fusan and the Seoul-New Wiju trunk lines with important trade centers, but light rail lines will quite answer the purpose.

The agricultural and sericultural industries in south Chosen have made a remarkable development. Rice, fruits, raw silk, etc., are being put on the Japanese markets in a major portion. In the line of marine products also, a wonderful progress is said to have been made. As regards industrial enterprises, Chosen seems not quite so pushing as South Manchuria, but there are many which may be leavened up in the future. It is decidedly stupid to make the development of industries in a colony a millstone to its mother country. Chosen will soon be able to open up north Manchuria, Siberian, and north China markets for her products. When such contingency is

taken into consideration, the recent annexation of the Chosen Lines to South Manchuria Lines and the proposed construction of the Kirin-Kwainai Line will not only bring Manchuria and Chosen into closer contact, but will also serve as a main artery of commerce between Japan, Manchuria, and north China.

South Manchuria Railway Returns.—The South Manchuria Railway traffic returns for September gave a daily average of Y.72,397.16 an increase by Y.21,554.62 over last year, as under: Passenger, Y.707,228.76; Goods, Y.1,218,539.97; Warehouse, Y.41,894.76; Miscellaneous, Y.204,751.31; a total of Y.2,171,914.80.

For October the receipts were: Passenger, Y.705,634.41; Goods, Y.1,554,115.18; Warehouse, Y.30,707.47; Miscellaneous, Y.130,701.17; a total of Y.2,451,158.23; Monthly increase on corresponding period of last year Y.19,603.63.

During the first 10 days in November a decrease was shown in the receipts which were: Passenger, Y.265,249.43; Goods, Y.652,953.34; Warehouse, Y.17,711.91; Miscellaneous, Y.60,888.59; a total of Y.996,803.27; being a decrease from corresponding period of last year of Y.13,902.07. The net increase thus for this year is Y.5,523,887.05.

Railway Congestion in Japan.—Anent railway congestion in Japan amounting to 500,000 tons, according to a semi-official statement recently issued, the total number of freight cars is now 43,800 of which 1,800 cars are always under repair. In the meantime the amount of consignments is increasing at a rapid rate.

Japan Buys Light Railway.—The Government has decided to purchase the Ishinomaki Light Railway, which runs from Kogota to Ishinomaki, in Miyagi prefecture. The decision was made in consequence of the recent completion of the Trans-Ou Railway with Kogota as the eastern terminus.

United States Railway Embargo.—Coincident with the news that the United States will operate all railways in the Eastern states comes word that the Canadian-Pacific Railroad Company, the Santa Fe, and the Western Pacific system have announced an embargo on all freights bound for points in the Orient. They declare that such a step is necessary in order to relieve the freight congestion now existing in the United States and state that the embargo will remain in force until the situation has been materially improved.

Japanese Railway Coal Needs.—The Imperial Japanese Railways will buy from 300,000 tons to 500,000 tons of coal during the coming fiscal year in some foreign market partly for the purpose of economizing its fuel cost and partly for the purpose of reducing the prices of coal in the home market. The yearly consumption of the Government railways amounts to roughly 2,000,000 tons.

Kyushu Electric Railway Plan.—The Kyushu Electric Railway Company whose paid-up capital is Y.930,000, out of a total

capital of Y.6,300,000, intends to collect the entire amount, and then increase the present capital to a total of Y.15,000,000. The shares will be allotted to the shareholders, one to one of the old, and the remaining 48,000 shares will be placed on the market for the subscription of the public.

Federated Malay States Railways.—In his report on the Federated Malay States Railways for 1916, Mr. G. H. Fox, then acting General Manager, writes:

The working of the Federated Malay States Railways during the year 1916 has produced a net profit of \$4,027,228.54 compared with \$2,636,397.93 in 1915. This result affords a striking commentary upon the general prosperity of the Malay Peninsula.

The net profit for the year is equivalent to a return of 3.94 per cent on the total capital expenditure (including lines not open for traffic), or to 4.35 per cent on capital expenditure on open lines only, compared with 2.97 per cent for 1915, calculated on the latter basis.

The receipts from all sources amounted to \$11,616,696.50 compared with \$9,051,243.17 for 1915, an increase of \$2,565,453.33 or 28.34 per cent. Of this increase, no less than \$1,669,581 arises on passenger traffic. The revenue expenditure on all accounts amounted to \$7,589,467.96 compared with \$6,414,845.24 for 1915, an increase of \$1,174,622.72 or 18.30 per cent. The increase in expenditure is attributable almost entirely to the very high cost of stores and materials, particularly coal. In the running of locomotives alone, coal is responsible for additional expenditure of about \$690,000.

The total capital expenditure to December 31, 1916, including lines not open for traffic, is \$102,211,994.28. The expenditure during the year was \$3,202,089.33. Out of this total the amount expended on lines not open for traffic is \$2,636,897.84, and on open line account \$565,191.49. Two items calling for special comment are the credits of \$423,628.11 under the heading of Road Motor Service and \$31,508.14 under Steamer and Ferry Service. The first named item represents the reduction of capital account consequent upon the closing down of this branch of the railway activities and the other arises through the sale of the launches *Winifred* and *Thistle* and three tongkangs to the Indian Government for military purposes.

No new mileage of running lines has been opened for traffic during the year. The mileage of lines is shown in statement I A, where it will be noticed that the total mileage of running lines, reduced to single track, is 918 miles 67 chains, and the total of single track, including sidings, is 1,028 miles 17 chains.

The total expenditure in respect of railway working is \$6,235,069.16, which is 58.33 per cent of the total traffic receipts—a figure which may be considered satisfactory. The total traffic receipts are \$10,688,181.73, to which is added \$103,315.22 representing miscellaneous receipts not arising from transport of passengers and goods. Of the former amount, \$6,082,913.03, or 56.91 per cent, represents passenger traffic: \$459,818.96, or 4.30 per cent, is other traffic by passenger trains; \$4,145,449.79, or 38.79 per cent, is goods train traffic.

The total number of passengers carried on the railway in 1916 was 14,741,066 as compared with 11,899,028 in 1915. Of these, 12,229,939, or 82.96 per cent, were third class passengers. There were, in addition, 8,920 season tickets issued. The total goods tonnage carried was 1,267,031 tons compared with 1,100,381 tons in 1915.

The total number of live stock carried in 1916 was 122,427 as compared with 104,822 in 1915.

The receipts on account of docks, etc., including charges on traffic passing over the various wharves owned by the railway, to-

gether with earnings on particular terminal services performed there show a profit of \$53,098.43. Special expenditure for the year amounted to \$42,035.07, of which \$40,298.26 was on account of new steel lighters. During the year, 79 ocean steamers called at Port Swettenham with import cargo as against 87 during 1915, and 39 steamers for export cargo, the same number as in 1915. These figures do not include the British India steamers which run regularly between Indian ports and Singapore, calling at Port Swettenham. 28,932 tons of rubber were exported through Port Swettenham during the year against 22,172 tons during 1915 and 15,147 tons in 1914.

Chinese Eastern Railway Traffic.—During October, staple produce sent south to Dairen from the Chinese Eastern Railway was:

Beans, 5,656 tons; bean cake, 492; bean oil, 919; kaoliang, 656; other cereals, 570; a total of 8,993 tons.

The appearance of produce appears rather backward this year. Kaoliang, for instance, used to arrive to the amount of about 10,000 tons in October, while this year the total was only 656 tons, which, even making allowances for the cereal anti-export injunction operating in Kirin province, was exceedingly small.

Manila Railroad Raises Wages.—Over 5,000 of the 6,000 odd employees of the Manila Railroad Company will receive, in the nature of a New Year's gift, a raise of 10 per cent, according to announcement made by Eugene E. Reed, president of the company. These sweeping promotions will, however, not include the staff and those employees allowed accrued leave pay, exception having been made of them in the decision arrived at by the board of directors of the company when the matter came up for consideration.

Shanghai Tramways.—The following is the Traffic Return of the Shanghai Tramways (Foreign Settlement) for the month of November, 1917, and for 11 months ended 30th November 1917, with figures for the corresponding periods last year:—

	November, 1917	November, 1916
Gross Receipts ...	\$141,519.35	\$138,353.50
Loss by currency depreciation ...	30,567.60	29,260.76
Effective Receipts Mex.	\$110,951.75	\$109,092.29
Percentage of loss by currency depreciation ...	22.84	22.36
Car Miles run ...	324,696	336,274
Passengers carried	6,439,264	6,307,290
	11 Months ended 30th November, 1917	11 Months ended 30th November, 1916
Gross Receipts ...	\$1,478,164.35	\$1,400,696.66
Loss by currency depreciation ...	325,628.03	359,610.15
Effective Receipts M.	\$1,125,536.32	\$1,041,086.51
Percentage of loss by currency depreciation ...	23.30	27.22
Car Miles run ...	3,684,228	3,458,749
Passengers carried	67,298,193	62,875,533

SHIPPING

Japan's Ship Building Facilities.—In Japan at present there are twelve important yards, including the Mitsubishi yards at Nagasaki and Kobe, the Kawasaki Dockyard,

the works of the Osaka Iron Works at Osaka and Inoshima, the Uruga Dockyard, the Ishikawajima Shipyard, the Ono Iron Works, the Fujinagata Shipyard, the Harima Shipyard, the Matsuo Iron Works, and the Tochigi Shipyard. These shipyards have 24 docks and 45 stocks where 47,860 workmen and 3,400 experts are employed, the details being as follows:

	Docks	Stocks	Ex-perts	Work-men
Mitsubishi Yard at Nagasaki ...	3	6	1,020	11,874
Mitsubishi Yard at Kobe ...	2	2	405	4,930
Kawasaki Dockyard	1	6	942	13,107
Osaka Iron Works	4	5	290	5,355
Osaka Iron Works at Inoshima ...	3	6	88	4,585
Uruga Dockyard ...	2	5	243	2,626
Ishikawajima shipyard ...	1	2	118	1,353
Ono Iron Works ...	3	4	34	760
Fujinagata Shipyard	2	4	100	1,200
Horima Shipyard...	1	2	55	660
Matsuo Iron Works	2	1	65	1,200
Tochigi Shipyard...	—	2	40	210

Those yards have recently enlarged their staffs and plants, but owing to the reduced supply of raw materials they cannot at present put their full capacity into play. Last year they launched 39 ships with a combined tonnage of 140,294 tons, but then the supply of raw materials was pretty well maintained. As may be judged from the following table this is a large advance over the preceding years:—

Years	Ships launched	Combined tonnage
1910 ...	4	15,817
1911 ...	6	23,935
1912 ...	7	27,183
1913 ...	4	34,478
1914 ...	19	80,959
1915 ...	8	40,485
1916 ...	39	140,294

But it is not the full capacity of the shipyards as recently enlarged. This year the different shipyards have laid keels for 29 ships with a combined tonnage of 135,350 tons, but according to an expert it is open to question whether these ships will be launched during the present year, owing to the scarcity of steel supplies. The normal capacity of those shipyards is about 203,025 tons. This is not a large figure as compared with the outputs of the advanced nations in the West as may be seen from the following table:

Countries	Ships built	Tonnage
Great Britain...	340	668,478
United States of America	63	159,264
Germany ...	—	—
France ...	6	25,402
Holland and Belgium ...	84	108,608
Italy ...	5	17,474
Norway ...	57	61,600
Sweden ...	24	19,825
Russia ...	1	161
Japan ...	8	40,485

The Japanese shipbuilders are fully protected by the Government under the Shipbuilding Encouragement Law if the ships they build are so made as to conform to the minute provisions in the bye laws to the main law.

"Some sections of the public," said Mr. Tsutsumi again, "argued that the bounties should be withdrawn in view of the recent activity but the present activity is not normal, being only an anomaly created by the war. The argument may also be sound and can be followed if it be put forth immediately after the war began, but it is now too late, as certificates have been granted by the Government for over three years ahead. Foreign builders also point to this as an advantage of the Japanese builders, but that is more than offset by the fact that they have to depend on foreign supplies of materials."

Wooden Ship Plant for Philippines.—

Another impetus to the shipbuilding industry now so rapidly developing in the Philippines as a result of war conditions and the resultant shortage of ocean tonnage, is being given by the Kirchmann Ship Building Company of San Francisco, in the interest of whom P. C. Due has arrived in Manila en route to Cadiz, Oriental Negros, where the company proposes to establish shipyards for the construction of a standardized type of five masted schooners to be used in the trans-Pacific trade. Mr. Due's company has contracts with the Philippine Lumber Company, whose mills are in Negros, for practically its entire output of lumber. It is his present plan to rush the establishment of his yards, which will probably be equipped with two slips at first, as that schooners may be two under construction at the same time. If the enterprise is the success which is contemplated, the capacity of the yards will be increased to six slips. Filipino labor will be employed entirely in the yards, for which some 200 men will be needed at the outset, this force being added to as business increases. The type of vessel to be built, five masted wooden schooners, will be standard ships to pass the United States ship building inspection.

Philippine Islands Government Shipyards.—

A million peso national shipbuilding enterprise is contemplated in a bill introduced in the House of Representatives by Representatives Vamenta, Lorenzo, and Aunario which calls for the organization of a national shipping company, with headquarters at Manila, to be capitalized at P.1,000,000. The insular government, represented by the governor general is to subscribe for fifty-one per cent of the capital stock, the rest to be sold to the public. The insular government participation in the board of directors is to be represented by the governor general, the president of the Senate, and the speaker of the House of Representatives. The company is to have an existence of 50 years, subject to the provisions of the corporation law, and shall engage in the construction and sale of vessels, and any other related enterprise. The capital stock is to be divided into 10,000 shares of P.100 each and may be purchased for cash on the payment of 10 per cent upon purchase, and the balance in installments to be fixed by the board of directors. The board of directors shall be five in number, two of whom are to be elected by the stockholders.

In the prosecution of the object for which it is created, the company is authorized to make use of any public lands, sea or foreshore, river, estero, and is empowered to obtain from the bureau of forestry free licenses for the cutting of construction material. The company is also authorized to import necessary expert labor, provided they be subjects of a nation not at war with the United States, and may contract them for a period not exceeding 50 years. The bill also appropriates the necessary sum to pay for the government share of the stock in the company, amounting to P.500,100.

Osaka Shosen Kaisha New Alps Maru.—

With the recent sailing of the Alps Maru on her maiden trip across the Pacific in Yokohama, a part of the expansion program of the Osaka Shosen Kaisha is learned. She is one of six steamers now being built by this firm for its European service, which has made such headway that all arrangements regarding the branches and agencies at ports of call have been made. Several leading officials of the firm are now in London, where the headquarters for the company's future activity in Europe will be located. It was originally planned to open the new European service in January, 1918, but owing to the increasing danger of navigation and the delay in com-

pleting the ships, the opening of the new service has been temporarily postponed.

The Alps Maru has the distinction of being the only ship in Japan to be built after the Isherwood style, one of the striking features of which patent being that ships after this style are made of longitudinal instead of latitudinal framing, enabling the quicker production of tonnage. The exclusive use of the patent has been acquired in Japan by the Osaka Iron Works.

Orders were placed recently with the Works by the Osaka Shosen Kaisha for twenty-four ships, aggregating approximately 200,000 tons, to be built in three years. All will be built after the new patent.

Including the Alps Maru, six ships, which are of similar size, will be commissioned on the European line. Their dimensions are: length, 425 feet; width, 56 feet; depth, 40 feet; 7,789 tons gross; 4,861 tons registered; 12,200 tons dead weight; and 17,000 tons displacement; triple expansion engines; speed, 11 knots; and 14 derricks, including one of 40 tons capacity, all operated by steam.

Plan Antung Shipyard.—The scheme for establishing a shipbuilding yard at Antung under the style of the Yalu Shipbuilding Co., by Mr. K. Fujita, of Mukden, and other Japanese capitalists of Manchuria is now in a fair way to fruition. The first installment of the Company's shares will be called up by December 10, and a general meeting of the shareholders will be held. The shipbuilding yard and office are now under construction on one of the sand bars of the Yalu and are expected to be finished in the course of the year. The keel of a 200 ton sailing vessel was laid down last month and the vessel will be launched in the spring. Several more sailers are expected to be built in the course of the next five months. The enterprise has the support of the Government-General of Chosen, which will give substantial help.

Fusion of Yokkaichi Shipbuilding Cos.—

Negotiations for amalgamation have been brought to a head between the Yokkaichi Shipbuilding Co. which had been under organization with the capital of Y.2,000,000, and the Nippon Shipbuilding and Transportation Co. capitalized at Y5,000,000. The new company intends to embark upon shipbuilding, dealings in ships, and marine transportation, with a capital of Y.5,000,000 under the title of the Nippon Shipbuilding and Transportation Co.

Tsingtao-Shanghai Steamer Rates.—The South Manchurian Railway Co., the Dairen Kisen Kaisha, the Osaka Shosen Kaisha, Messrs. Jardine, Matheson & Co., and Messrs. Butterfield & Swire, all of whom are interested in the Tsingtao-Shanghai steamer service, have announced a further rise of steamer freights effective from December 1st, as follows:

	Old Rates	New Rates
Groundnuts per picul...	35 sen	40 sen
Oil in cases "	50 sen	55 sen
Oil in casks "	55 sen	60 sen
Oil in baskets "	60 sen	65 sen
General cargo per ton	Y.6	Y.7.50

Philippine Islands First Ship Launched.—

Probably the first wooden vessel to be constructed of any size in the islands was that launched at the end of October, from the docks of the Henning Shipping and Docking Company, located in the mouth of Bolinao River, Pangasinan. The vessel is of 500 tons capacity, and its launching on Monday was attended by all the provincial and municipal authorities of Pangasinan. This shipbuilding company came into existence at the time the

scarcity of bottoms was first felt in the islands, and since that time has already launched four or five vessels of small tonnage. The present hull is intended for a small steamer, ordered by a Visayan commercial firm. Owing to the location of the docks of the company, the acquisition of lumber from the near-by forests is easy, as the Bolinao River on which the docks are located aid materially in bringing planks and logs down from the cutting locality. The company now has 250 men working, and employs over 500 carabaos to do much of the hauling work necessary in hull construction.

New China Navigation Co. Steamer.—

The China Navigation Co.'s new steamer Suiyang, which is practically a sister ship to Shantung, Sinkiang and Sunning, arrived in Shanghai on November 25 on her maiden voyage from Hongkong, via Amoy. Constructed entirely at the Taikoo Dockyard in Hongkong, the new vessel is a credit to her builders and should prove one of the most serviceable and popular boats on the run from Shanghai to Hongkong and Canton. With a length of 310 ft., 41 ft. beam, and 24 ft. 9 in. in depth, her gross tonnage is 2,448 and her deadweight capacity is 3,010 tons, and on the trial trip held at Hongkong she developed a speed of 12.68 knots. On the bridge deck is cabin and saloon accommodation for seven passengers, situated entirely away from the Chinese deck passengers, and fitted and furnished in most modern style. The officers and engineers are also accommodated on the bridge deck, and the captain's quarters are on the fore part of the boat deck. On the spar deck, below the bridge, there are berths for 62 Chinese second-class passengers, and here also are the galleys and also the quarters for the native staff; while in the after house of the same deck are cabins for 32 Chinese first-class passengers, and in the 'tween decks accommodation for 108 Chinese third-class passengers. There are four cargo hatchways, and six steam winches, with seven derricks for the rapid handling of cargo, capable of bearing weights up to 30 tons. She has a double bottom fore and aft, in accordance with the latest passenger ship requirements, and, needless to say, is fitted throughout with electric light and with electric fans. A feature of the ship is the fine promenade afforded by the poop deck. Capt. J. Gibbs, formerly of the C.N.S. Yingchow, is in command.

Hongkong and Whampoa Launchings

—On November 15 the Hongkong and Whampoa Dock Co., Ltd., launched from their yard at Kowloon two vessels similar to the S.S. Prosper and S.S. Helikan recently completed by them. The new vessels were christened the Prominent and Hermelin. Their principal dimensions and particulars are as follows:—Length overall, 280 ft. 6 ins.; length between perpendiculars, 270 ft.; breadth molded, 40 ft.; and depth molded, 21 ft. 6 ins. The vessels are built to Lloyd's highest class and to Board of Trade requirements. The gross tonnage of each is approximately 2,170 tons, and the deadweight carrying capacity 3,000 tons on Lloyd's freeboard. They are of the two-deck type with poop, bridge and top-gallant fore-castle. To the upper deck there are four watertight bulkheads to boat deck, machinery space, and steam steering gear are provided amidships. There is a cellular bottom, all fore and aft, reserve feed under engine and dry tank under boilers. Six steam winches on the upper deck operate six derricks mounted on tables on two masts. There is also a steam winch on the poop deck.

Accommodation for passengers and officers is provided amidships, the cabins being fitted in modern style. The second class and com-pradore staff are berthed in poop. The ships are electrically lighted throughout, and the latest type of wireless is installed. The machinery of each vessel consists of one set of triple expansion engines of 1,300 indicated horsepower and two main boilers, 14 ft. 3 ins. diameter by 10 ft. 6 ins. long, with a working pressure

of 180 lbs. The auxiliary machinery comprises a separate centrifugal circulating pump, two Weir feed pumps and heaters, ballast and general service pumps, and a Morrison evaporator capable of producing daily 15 tons of water.

The sea-going speed of the *Prominent* and *Hermelin* will be ten knots an hour. By the end of December the Dock will have launched over 20,000 tons of new shipping in 1917.

Blue Funnel Buys in Japan.—The Blue Funnel line has bought nine new steamers in Japan recently launched in Nagasaki for the Suzuki Shoten, Kobe, and a 7,000 d. w. tons freighter. A representative of the British firm is also said to have bought one ship in Kobe and two in Yokosuka, and has been trying to get another in Nagasaki. Negotiations for the purchase of three other vessels are reported to have been concluded in the Osaka direction.

Freight Steamer Launched in Japan.—A freight steamer, ordered by the Suzuki Shoten, of Kobe, was launched by the Mitsubishi Dockyard and Engine Works, Nagasaki, recently. The vessel is a sister ship of the *Yone Maru*, which was built at the Dockyard last year and sold to a Norwegian firm. The new vessel is understood to have been sold to British owners. The *Yone Maru No. 2* is a steel, single-screw steamer, and has been built in accordance with the regulations of the Department of Communication and under the supervision of the local Surveyors of Lloyd's Register of Shipping, by whom she will be classed 100 A1. Her principal dimensions are as follows:—Length, 445 feet; breadth, 58 feet; depth, 34 feet; gross tonnage, 7,317. She will be fitted with triple-expansion engines of 3,750 horse-power and have a speed of twelve knots. The *Yone Maru No. 2* was commenced on June 12 and was completed for service in November.

Japanese Shipping Association.—The Mitsubishi, Kawasaki, Asano, Uruga, and Yokohama dockyard companies, the Watanabe Ironworks, Messrs. Suzuki & Co., and the Mitsui Bussan Kaisha have decided to organize a shipping association called the Sempaku Kyokai.

FINANCE

China-Japanese Bank.—Leading Tokyo bankers and financiers held a conference in the office of the Bank of Japan, on November 21, to pass the final program for the organization of the proposed China-Japanese Exchange Bank, and the plan as announced informally is as follows:

The new bank will have a capital of Y.10,000,000, of which Y.5,000,000 will be paid in simultaneously with the actual organization of the concern. The shares of the new bank number 100,000, being of Y.100 denomination. Half the amount will be taken up by Chinese. In Japan 50,000 shares will be subscribed to the Bank of Chosen, the Bank of Taiwan, the Industrial Bank of Japan, the Mitsui Bank, the Mitsubishi Banking Department, the First Bank, the Fifteenth Bank, the Yasuda Bank, the One-hundredth Bank, the Thirty-fourth Bank, the Naniwa Bank, the Yamaguchi Bank, the Kajima Bank, the Omi Bank, the Sumitomo Bank, Baron R. Kondo, Mr. S. Asano, Baron K. Okura, Baron T. Furukawa, and other business magnates, while in China many men well known in political and commercial circles, including, President Feng Kuo-chang, will take up shares.

The Bank will have its head office in Peking and branches in Shanghai, Tientsin, Tsinan,

and North Manchuria. The actual management of the undertaking will be taken up by Mr. Liu Tsung-yu as President, and Mr. Tsunejiro Kakiuchi as Managing Director.

United States to Join in China Loan.—Decision has finally been made by the United States to join in the Currency Loan to be made to China by the International Banking Syndicate, according to reports of Japanese papers. At a meeting of the foreign bankers held in Peking in November, representatives of Great Britain and France urged America's participation. Japan, too, has favored the entry of the United States.

Japanese Accept Russian Notes.—The Russo-Japanese Trade Association in Osaka is reported to have decided to accept Y.34,000,000 worth of one-year promissory notes issued by Russian financial agents here as payment for Russia's past purchases in Japan.

Siems-Carey Canal Loan.—Hsiung Hsi-ling, on behalf of the Government, signed the Canal Loan of \$6,000,000 with the Siems-Carey Corporation on November 20. According to Peking dispatches, it will be issued at 90, bear interest at seven per cent and be redeemable in twenty years, beginning at the sixth year. The Japanese are supplying \$2,500,000 of the total loan.

Chosen Loan Oversubscribed.—The subscription books for the new Chosen loan were closed in the middle of November with splendid success for the Government, the tenders received having far exceeded the required amount of capital.

According to an announcement by the Bank of Japan the subscriptions are Y.76,900,000 against Y.45,000,000 put on the market. Of this figure Y.47,900,000 is cash tender while Y.29,000,000 is the total amount of subscriptions for conversion of old Chosen bonds. The old maturing loan is worth Y.35,000,000 against which Y.29,000,000 worth of tenders has been received. The Government will accordingly have to pay the balance in cash. The largest of the tenders is said to be Y.3,000,000 while there are a few small tenders for Y.25.

Japanese Treasury Gains.—The Imperial Japanese Treasury's revenue for this fiscal year, made up to the close of October, shows a striking increase over the preceding year even without taking into account the balance brought over from last year, which is Y.97,167,230. The total of ordinary revenue is Y.206,087,300, which is an increase of Y.29,450,068, over the corresponding period of last year. Of all items under this head only three including miscellaneous receipts, and receipts from Taiwan and Chosen show any decrease. The total of tax revenue amounts to Y.123,942,943, being an increase of Y.14,401,858 over last year. The income and land taxes show insignificant increases but the business tax presents an increase of Y.1,783,187. The sake, sugar, and textile taxes also increased by Y.4,140,144, Y.412,552, and Y.1,447,801 respectively. The increase in import duties amounts to Y.3,202,477. The increase in stamp duties amounts to Y.6,445,871. Nothing except direct taxes is more important than revenue sources than State enterprises, of which the postal service is the foremost. The receipts from those sources are Y.53,593,728 of which Y.41,859,743 goes for the postal service. This is an increase of Y.8,157,888.

Under extraordinary revenue is the sale of arms and munitions which fetched Y.18,356,511, an increase of Y.13,322,521 over last year. Interest receipts are Y.8,715,344 an increase of Y.6,693,868, the result of Japan's growing investment in foreign bonds and notes.

Mint for Philippines Proposed.—Acting on one of the recommendations made by the governor general in his first message to the legislature, delivered at the opening session of that body, a bill has been introduced in the lower house creating an insular mint, which is to be under the secretary of finance. For the purchase of the necessary plant, and for salaries of the officers and employees P.200,000 is appropriated. The mint is to have a director to be appointed by the governor general with the advice and consent of the senate, at a salary not exceeding P.7,200 per annum.

MINES AND METALS

REVIEW OF CHINA'S MINERAL INDUSTRY

The reports received show that despite various favorable features, the mineral industry of China was carried on last year under very difficult conditions, and the results make a less favorable showing than was to be expected says the *Mining Journal*.

Conditions in the west and Southwest generally appear to have little relation to the central Government, and much silver was sent from Yunnan into Burma for safe keeping during last year. The rise in silver, by increasing the purchasing power of the country in European markets, under normal conditions offsets the handicap to export by enabling large importations from other countries. There was a general scarcity of silver, and the Japanese and other agencies were allowed to purchase cash for converting into copper metal on such a scale that 30,000 tons of copper ingots were shipped from Kiaochow, where twenty-seven smelting establishments sprang up. In addition, great quantities of silver were sent to Shanghai and elsewhere to cover purchases of gold, showing that the native merchant is beginning to appreciate the teaching which has been so assiduously pressed upon him as to the advantage of a gold reserve. Much of this silver was exported, and it is permanently lost to the currency. The entire want of policy by the Government is illustrated by the order issued in May, 1916, to the Bank of China and to the Bank of Communications to suspend all cash payments. The Shanghai branch of the Bank of China, ignoring the threatened penalties, disregarded the Government mandate, and with the aid of the foreign banks was able to meet the run which the Government action necessitated, and thus averted a serious financial crisis.

Turning now to consider the mineral industry more in detail, antimony first claims attention as the commodity of highest value. The enormous prices and scramble for supply produced a considerable surplus in the world's requirements last year. In Changsha the price fell from Tls. 550 in the March quarter to Tls. 115 in August, followed by a recovery to Tls. 180 at the end of the year. Japan was overstocked, as became apparent from the offerings from that quarter. In Mengtsz also the price fell heavily during the year. The total export increased somewhat over 1915, especially for ore. For the purposes of very rough comparison, we may perhaps take the average for regulus and crude at 80 per cent, and for ore at 50 per cent. On such a basis, the export in 1916 was 23,462 tons, as compared with 18,884 tons in the case of 1915. Works for the reduction of regulus were erected at Samshui during the year.

The net export of tin was lower, amounting to 4,717 tons, against 5,417 tons in 1915. Not only were the shipments from Yunnan lower, but the imports into China itself showed some increase. The French railway from Yunnan to Haiphong experienced a more favorable year than usual as regards washouts, and traffic was not disorganized as in 1915. Consequently, internal conditions alone appear to have been responsible for the decline.

Copper exports showed unusual activity. The net export was 31,499 tons, against 227 tons in the previous year. Almost all seems to have been due to the conversion of copper cash into metal, and the increase does not represent any noticeable improvement in the mine production. A small output is reported for the first time from the re-opened Tienpao-shan mine. The mine is a silver-copper proposition about forty miles from Lungching-tsun. In 1894 the mine employed 2,000 men, but owing to water trouble it was closed down in 1900, and has now been taken up by a Sino-Japanese syndicate. A branch line is being built to bring in coke and supplies. Last year's shipments of American copper from China have largely disposed of the great purchases made in 1,905, amounting to roughly 40,000 short tons. The Penkihiu Coal & Iron Mining Company largely increased its capital, with a view to doubling output, and is taking steps to increase its smelting capacity. The exports of coal for the year were 1,314,822 tons, against 1,315,542 tons in 1915. The output of the Kailan mines was 2,853,256 tons. The Honan anthracite output was doubled. The Fushun collieries produced 2,200,000 tons, employing about 22,000 men—chiefly Chinese. Important sulphate of ammonia, nitro-lime, and calcium carbide works have been erected. Electricity is generated from the coal by means of a Mond gas plant.

Exports of iron ore were somewhat less, amounting to 278,555 tons, against 304,088 tons in the previous year. Pig iron, however, was better at 148,400 tons, against 95,011 tons. The South Manchuria Railway Company will erect smelters to deal with the Aushanchan iron ores. The new company has a capital of £1,000,000. Exports of quicksilver showed a decrease at 175 tons, against 207 tons. Imports of lead declined, amounting to 4,573 tons, against 5,594 tons, but there was considerable development in the export of ores, which reached 8,840 tons. Exports of metal were 1,110 tons, against 675 tons. The zinc trade withered. Exports of spelter were 762 tons, against 2,291 tons, and of ore 404 tons, against 8,406 tons. There was a marked increase in miscellaneous metals and ores, the total of which was 23,727 tons, against 12,773 tons. In this total is included some wolfram ore from Changsha, which, though of low grade, is reported to be very clean, and the outlook is considered promising, but no figures as to production are available. As regards the ore trade from China generally the old complaint is still prominent, that the Chinese cannot or will not keep their parcels to sample, and, consequently, London or American firms would only pay on the actual return and will not buy on sample analysis. Japanese smelters are said to be less particular. Some export of magnetite is reported from Kiungchow, and of manganese from Pakhoi.

The war naturally exercised an adverse effect on the oil trade, and there was a further all-round decrease. The total import for the year amounted to 147,390,353 gallons, compared with 185,070,111 gallons. The United States contributed 108,925,192 gallons, Sumatra, 19,222,519 gallons; Borneo, 10,447,572 gallons; Japan, 6,408,990; gallons, and Russia, 1,242,442 gallons. One result of the increasing price of oil is to favor the establishment of works for the generation of electric power.

Japanese Mineral Output.—The report of the Japanese Mining Bureau Reflects the American steel problem on Japan's mining industry in the yield of iron which increased 40.2 per cent to 6,189 tons, although even this result is still short of expectations. The cause for this increase is the stimulus given by the American steel ban.

Copper and coal also increased 8.6 per cent and 7.9 per cent respectively during September, but copper did not sell well, the most of the month's output, estimated at 12,163,586 kin having been left in the hands of holders. Coal reached 1,743,803 tons, but the rate of increase was short of expectations.

Silver, petroleum, and sulphur fell off substantially by 4.7 per cent, 12.9 per cent, and 6 per cent respectively. The total output for the first nine months of the year of petroleum was also a reduction of 10.8 per cent, forming a factor to increase prices in the market.

The total output of mineral for the first seven months of 1917 was as follows:

Gold, 1,205,175 momme; silver, 31,767,331 momme; copper, 87,433,897 kin; iron, 43,611 tons; coal, 13,143,144 tons; petroleum, 14,347,028 koku; sulphur, 60,356 tons.

Chinlingchen Iron Mine.—The Department of Agriculture and Commerce, Tokyo, has set aside an appropriation of Y.10,000,000 for 1918 and 1919 for the production of 100,000 tons of iron per annum in pursuance of the Government policy to meet the demand with domestic outputs. The question where the necessary iron ore shall be obtained has not yet been quite solved. As a result of negotiations with the War Office, the Department of Agriculture and Commerce has decided to operate the Chinlingchen iron mine in Shantung province under its own direct management, and is pushing forward investigations to that end.

Iron Accumulations at Hongkong.—Nippon Yusen Kaisha steamers are visiting Hongkong at the rate of 3 mail liners and 1 auxiliary ship per week, all taking home iron plates, pig iron, etc., produced in China. There is at Hongkong still an accumulation of iron materials estimated at 10,000 tons, according to Japanese reports, which fail to state where this material originated beyond crediting it to China.

Steel Plant for Nagasaki.—The Oriental Steel Manufacturing Company held a meeting of directors on November 16 in Tokyo, when, it is understood, Nagasaki was selected as the site of the company's plant. The purchase of smelting furnaces in New York has already been completed by the company's agent. The plant will reach Japan in March.

Investigating China's Ore.—Mr. Susumu Hattori, Vice President of the Government Ironworks, is in Tsingtao, to investigate conditions for the supply of ores from Shantung. He will also visit the Manchurian provinces and will return to Tokyo before the Diet opens.

Penchihiu Smelting Furnace No. 2. The second smelting furnace for the Penchihiu Colliery and Mining Co. has been recently installed. Its construction, ordered from the South Manchuria Railway Workshops, Shenhokou, had been delayed owing to dearth of material and press of work.

On December 7 the first fire will be built in the grate of the new furnace by Baron K. H. Okura, head of Messrs. Okura and Co., which holds half the shares of the company under Sino-Japanese joint management. The new furnace is located at the east of the old one and is capable of putting out 150 tons, the same as the other. The annual output of the Company will be about 100,000 tons of pig iron from next year. At the same time, the mining arrangements at Nanfen will be enlarged so as to yield sufficient for the two furnaces.

The body of the first smelting furnace is of English make, whilst the hoist was then the latest German system patented by the inventor. The patent was bought by Japan, and while the manufacture of the hoist is attended with risks, once it is completed, it is the most convenient obtainable.

The second furnace has been wholly made by Japanese hands from plans used for the fourth and fifth furnaces of the Government Steel Works, Edamitsu. The furnaces for the new Anshan Steel Works, although more extensive in scale, are patterned after the same system.

Mr. Wang Tsai-shan, former co-Director-General of the Penchihiu Colliery and Mining Co., has resigned from that post and has been succeeded by Mr. Tuan Kuo-chi.

Kobayashi Mining Company.—The Kobayashi Mining Company has increased its capital from Y.1,000,000 to Y.5,000,000, to establish a zinc refinery. Out of the new shares 30,000 shares were offered for public subscription.

No Lead for Lead Pencils in Japan.—The scarcity of lead and zinc has enhanced the prices of these metals, so that the supply for the manufacture of pencils (says the *Japan Times*) has become difficult. The supply of these materials comes from Australia and Singapore, and a certain amount from China. Import from Australia has declined this year, while that from China has been checked by high exchange. The stocks within the country have, therefore, met a vast decline so that many of the pencil manufacturing firms (reiterates the *Japan Times*) have had to close or suspend their works. The price of zinc on this account has recently risen about 5 yen, and a ton of the metal costs 145 yen. Hardly any transactions are brought up in the lead line, but the tone is firm, at a level of 27 to 28 yen per 100 kin. [As Japanese lead pencils are made from graphite some other cause must be assigned for closing the factories.]

Japanese Coal Market.—The Japanese coal market continues its steady ascent. The latest quotations are Y.35 per ton for Kyushu and Hokkaido lump coal of A. 1 quality and Y.32 for that of the next grade. Even the sweepings fetch Y.20. Pieces of lump coal which dropped into the sea while coal was being loaded into steamers by lighter are now being recovered and are in good request at Y.26 per ton.

Fushun Coal Sales.—The following table shows how the Fushun coal outputs were disposed of during the last fiscal year ended March 31:

	Eng. Tons
For use S. M. R. Co. and its	
servants.....	538,812
Manchuria	842,692
South Seas	140,827
South China.....	205,223
North China.....	92,052
Chosen	298,672
Formosa	23,197
Japan.....	197,661
Bunkers.....	258,617
Total.....	2,579,752

Amercian Survey Siberia Mine.—Three American miners said to represent one of the biggest mining concerns in New York, passed through Japan on their way to Rombzovka, Siberia, where they will make a survey prior to an investment on a large scale. They are Mr. William R. Dixon; Mr. Oliver P. Fisher, and William Hutchinson.

Seoul Mining Company.—For the month of October the mills on the Suan Concession treated 18,270 tons of ore and recovered Y.281,511.78. The developments at the Tul Mi Chung Mine continue satisfactorily, new ore bodies having been discovered in the past month.

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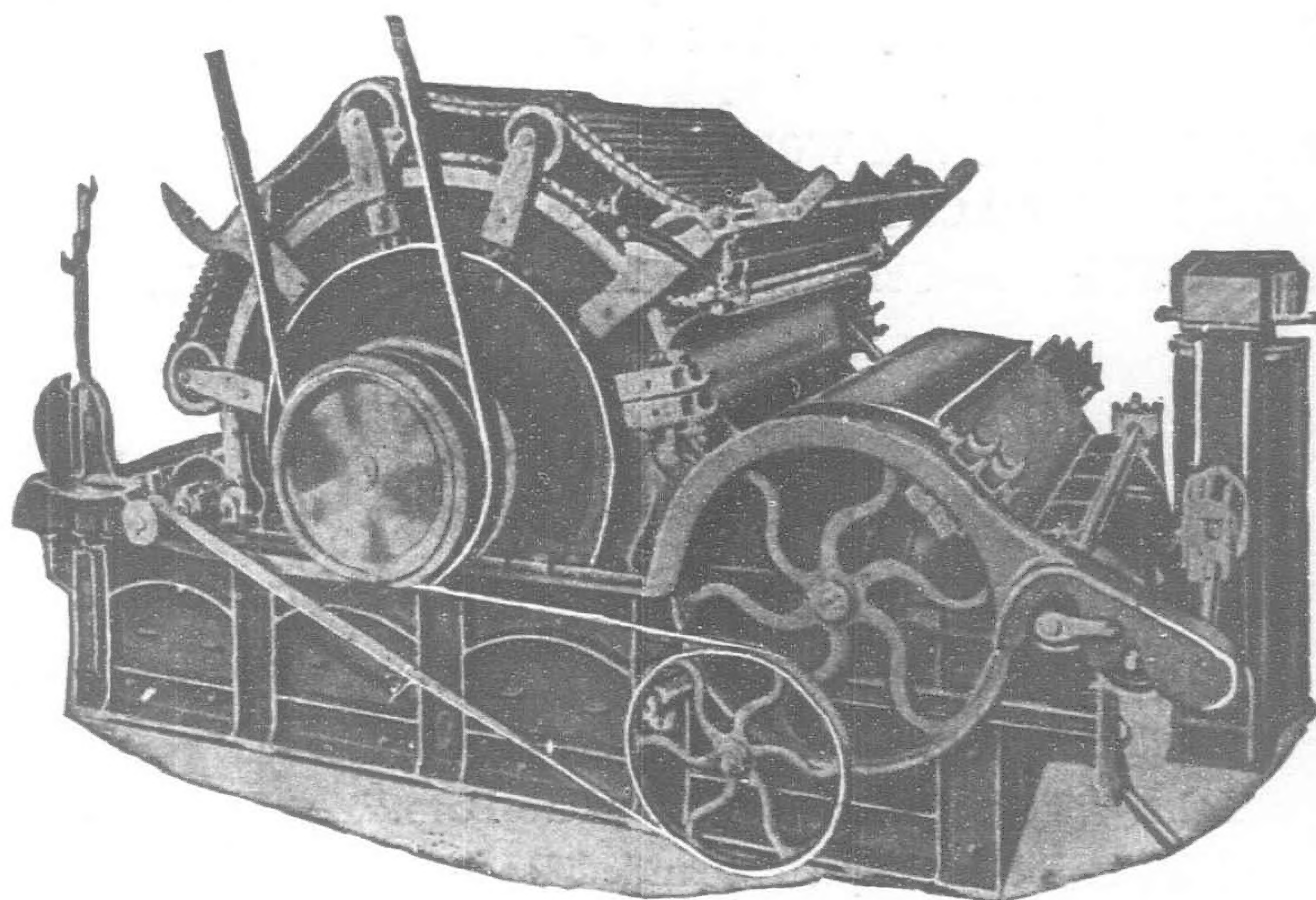
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